A Hayden Publication

August 1983 $3.00

PERSONAL COMPUTING

Canada & International $3.50

ARE YOU AFRAID OF COMPUTERS?

☐YES ☐NO

Will Computers Solve Our Educational Crisis?

Computing Your Fitness And Health

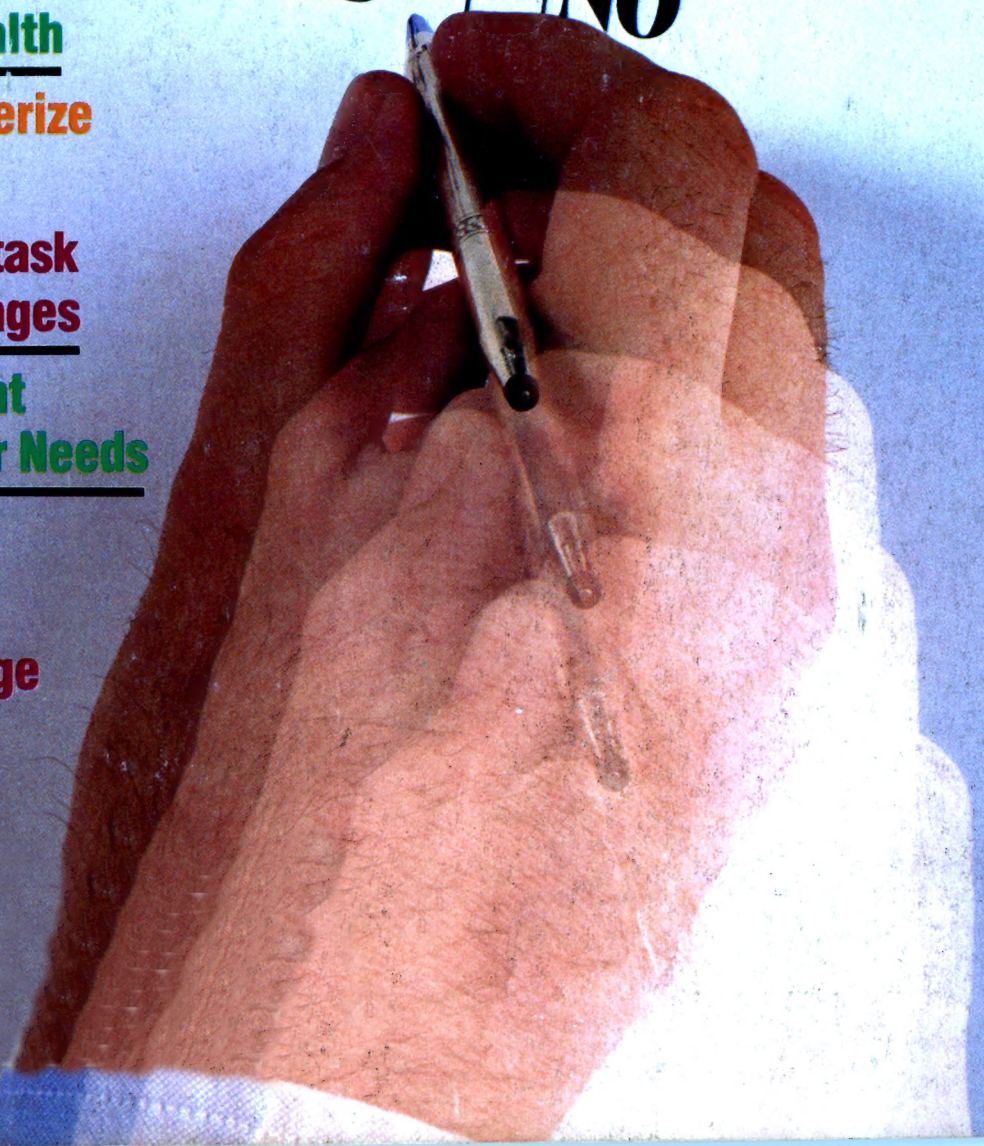
How To Computerize Your Company

The New Multi-task Business Packages

Buying The Right System For Your Needs

Is Your System Insured?

The Racer's Edge Of Computer Designed Sails



0 70989 36666

"My Dad bought NEC TREK for all the wrong reasons."

When I told my Dad about NEC TREK, NEC's new personal computer, he wanted one right away.

I told him it's a Z80-based system with 16K ROM/16K RAM expandable to 32K ROM/32K RAM.

He said it looks like fun.

I told him it has 10 programmable function keys, high-powered graphics capabilities, powerful Microsoft BASIC included, and an 8-octave programmable musical tone generator.

He said it has lots of "fun games".

I told him how its memory storage can interface with cassette, diskette, or cartridge, and how it has a wide variety of sophisticated software available—important things like financial management packages. And how NEC gives him big system power at a small system price, including options like their thermal printer, disk drive, digitizer touch panel, expansion unit and data recorder. The whole package for under $2,000, and the computer itself is only $349.

He just challenged me to a game of Protector.

That's my Dad. I love him, but sometimes I wish he could understand how a kid feels.

NEC

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Personal Computer Division
1401 Estes Avenue, Elk Grove Village, IL 60007
Nippon Electric Co., Ltd., Tokyo, Japan

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CIRCLE 1

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- ☑ is built with the established Mountain standards of quality and reliability?

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CIRCLE 2

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August 1983
Volume 7
Number 8
A Hayden Publication

PERSONAL COMPUTING

FEATURES

PERSONAL COMPUTING
Will Computers Solve Our Educational Crisis?
ARE YOU AFRAID OF COMPUTERS?
YES NO
Computing Your Fitness And Health
How To Computerize Your Company
The New Multi-task Business Packages
Buying The Right System For Your Needs
Is Your System Insured?
The Racer's Edge Of Computer Designed Sails

The most important thing to know about computerphobia is that it's a natural reaction to something unfamiliar. If you allow yourself to be a little ignorant, take some time to learn, give the computer a chance, and take things one step at a time, you'll realize *you* are in charge—not the computer.
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GEORGE B. FRY III

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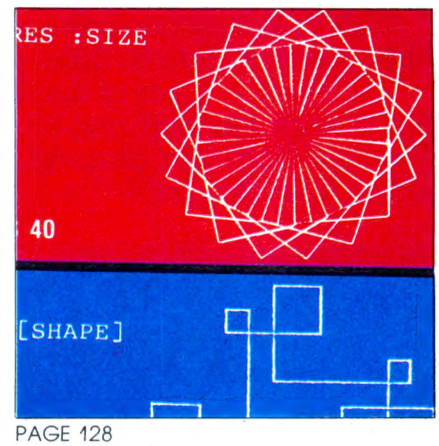

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Introducing the most logical place to store Elephant Memory Systems® (or lesser brands of disks): The Trunk.

With its alphabetized library index, you can file or retrieve up to 60 disks, instantly.

The Trunk is made of durable molded plastic with a hinged, one-piece lid, to keep disks safe from dust, dirt, and other detriments which disks despise.

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There's a model for 5¼" and 8" floppies, as well as a cassette-and-game file and a special Atari® version.

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CIRCLE 106

PERSONAL COMPUTING

Lend A Helping Hand

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Not long ago, I flew to Chicago to attend the Consumer Electronics Show. It's a trade show, put together for retailers and buyers for mass merchandisers, chain stores, and audio dealers. Nevertheless, I was surprised because there was very little in the Personal Computer Exhibit area that had anything to do with personal computers or personal computing. I was upset by that because I realized a lot of people were going to pass through the Personal Computer Exhibit and be confused by what they saw—and misled by what they didn't see. They were not being given a good overview of what I consider to be personal computers and personal computing. To me, it was an indicator of a serious problem—the difference between what people expect versus what they get when they buy a personal computer.

Shortly after the show, another indicator of the same problem surfaced when Texas Instruments announced a loss of $100 million because sales of their software and hardware had plunged. There was a shock wave of surprise and concern and serious people in the industry began to rethink the home-market premise. Does it really exist? And if it does, what's its real size? What does the consumer expect when he buys a computer?

At this point, it's important to agree on a few definitions. A personal computer is a tool. It serves a real purpose. It's a means to an end, not an end in itself. A machine designed to help the user acquire computer literacy may not be enough to help him achieve his objectives in buying the machine in the first place and as a result, single-function machines won't have the wide market appeal that some were expecting. In the case of Texas Instruments and Atari, they simply overestimated the market and its growth. Of course, as one senior official remarked, "In what other industry would you be apologizing for 100 percent growth?" Nevertheless, the problem of what a consumer expects remains.

There are reasons for that. Some companies have concentrated on selling hardware features rather than the functions they can perform. Their message, "We've got as much RAM as the next guy, as many bells, as many whistles . . ." leads the consumer to believe that the hardware is the whole ball of wax. But the fact is that computers retailing for under $100 are functionally limited systems.

If the buyer understands from the beginning that the purpose of these machines is to entertain, to help users become literate, then everybody goes away happy because the buyer gets what he expected. But if the consumer is led into the deal thinking he's saving hundreds of dollars on the price of a productivity machine, he's going to end up feeling cheated.

Whose fault is it?

All of us share in the blame. Manufacturers owe consumers an intelligent explanation of what their equipment is—and is not—designed to do. But the lion's share of the responsibility to help people into computing, and to help insure that they aren't led astray by some hustler who tells them a low-end machine will handle massive files in record time, falls on you and me. We've got the information they need. We can help them make an intelligent choice. We here at the magazine are dedicated to helping people solve this problem by focusing on the question, "What can I do with my computer?"

Getting the right advice is important. Giving the right advice is even more important. If the person you're trying to help goes away knowing that he can't make an intelligent and successful buy until he knows what his objectives are, you've done a lot for him—and by extension—for the future of personal computing.

Robert Lydon

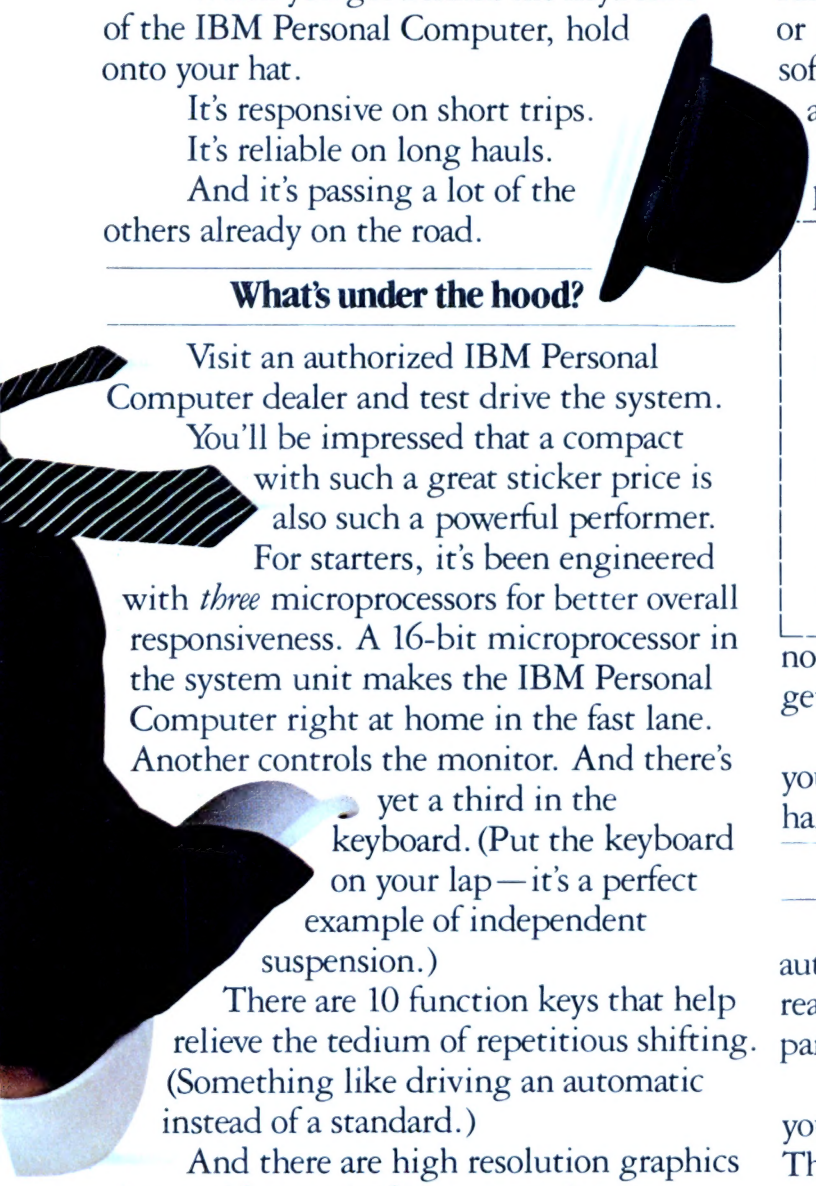
How to test drive the IBM Personal Computer.

When you get behind the keyboard of the IBM Personal Computer, hold onto your hat.

It's responsive on short trips.

It's reliable on long hauls.

And it's passing a lot of the others already on the road.



What's under the hood?

Visit an authorized IBM Personal Computer dealer and test drive the system.

You'll be impressed that a compact with such a great sticker price is also such a powerful performer.

For starters, it's been engineered with *three* microprocessors for better overall responsiveness. A 16-bit microprocessor in the system unit makes the IBM Personal Computer right at home in the fast lane. Another controls the monitor. And there's yet a third in the keyboard. (Put the keyboard on your lap—it's a perfect example of independent suspension.)

There are 10 function keys that help relieve the tedium of repetitious shifting. (Something like driving an automatic instead of a standard.)

And there are high resolution graphics that could come in first—were there a Grand Prix of personal computers. Get a demonstration of the text and graphics mix. And be sure to see it all in living color. (For more specifics, check out the box at right.)

Easy acceleration.

Whether you plan on using the IBM Personal Computer to manage a department, run a business, teach a course, learn a lesson or simply go on a pleasure drive—there's software to head you in the right direction and to help you stay ahead.

While you're at the store, try a few programs—first hand. Even if you've had no computer experience, you can quickly get into gear.

The driver's manual IBM wrote for you will help simplify matters. And the hardware's been designed to do the same.

IBM PERSONAL COMPUTER SPECIFICATIONS

User Memory
64K-640K bytes

Microprocessor
16-bit, 8088

Auxiliary Memory
2 optional internal diskette drives, 5¼" 160KB/180KB or 320KB/360KB per diskette

Keyboard
83 keys, 6 ft. cord attaches to system unit
10 function keys
10-key numeric pad

Diagnostics
Power-on self testing
Parity checking

Display Screens
Color or monochrome
High-resolution
80 characters x 25 lines
Upper and lower case

Operating Systems
DOS, UCSD p-System, CP/M-86†

Languages
BASIC, Pascal, FORTRAN, MACRO Assembler, COBOL

Printer
All-points-addressable graphics capability
Bidirectional
80 characters/second
18 character styles
9 x 9 character matrix

Permanent Memory
(ROM) 40K bytes

Color/Graphics
Text mode:
16 colors
256 characters and symbols in ROM
Graphics mode:
4-color resolution: 320h x 200v
Black & white resolution: 640h x 200v
Simultaneous graphics & text capability

Communications
RS-232-C interface
SDLC, Asynchronous, Bisynchronous protocols
Up to 9600 bits per second

They won't steer you wrong.

The trained salespeople at your authorized IBM Personal Computer dealer realize that you may never have been in this particular driver's seat before.

They want you to relax. They want you to ask any question you want to ask. They're ready and willing to provide you with all the answers—and to help pick the system and the software right for you.

For more information on where to buy the IBM Personal Computer, call 800-447-4700. In Alaska or Hawaii, call 800-447-0890.

You'll see why the IBM Personal Computer doesn't take a back seat to any other system.

IBM®

CIRCLE 3

The IBM Personal Computer
A tool for modern times

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BASF Qualimetric FlexyDisks® offer you more...an extraordinary new lifetime warranty. The BASF Qualimetric standard is a dramatic new international standard of quality in magnetic media...insurance that your most vital information will be secure for tomorrow when you enter it on BASF FlexyDisks today.*

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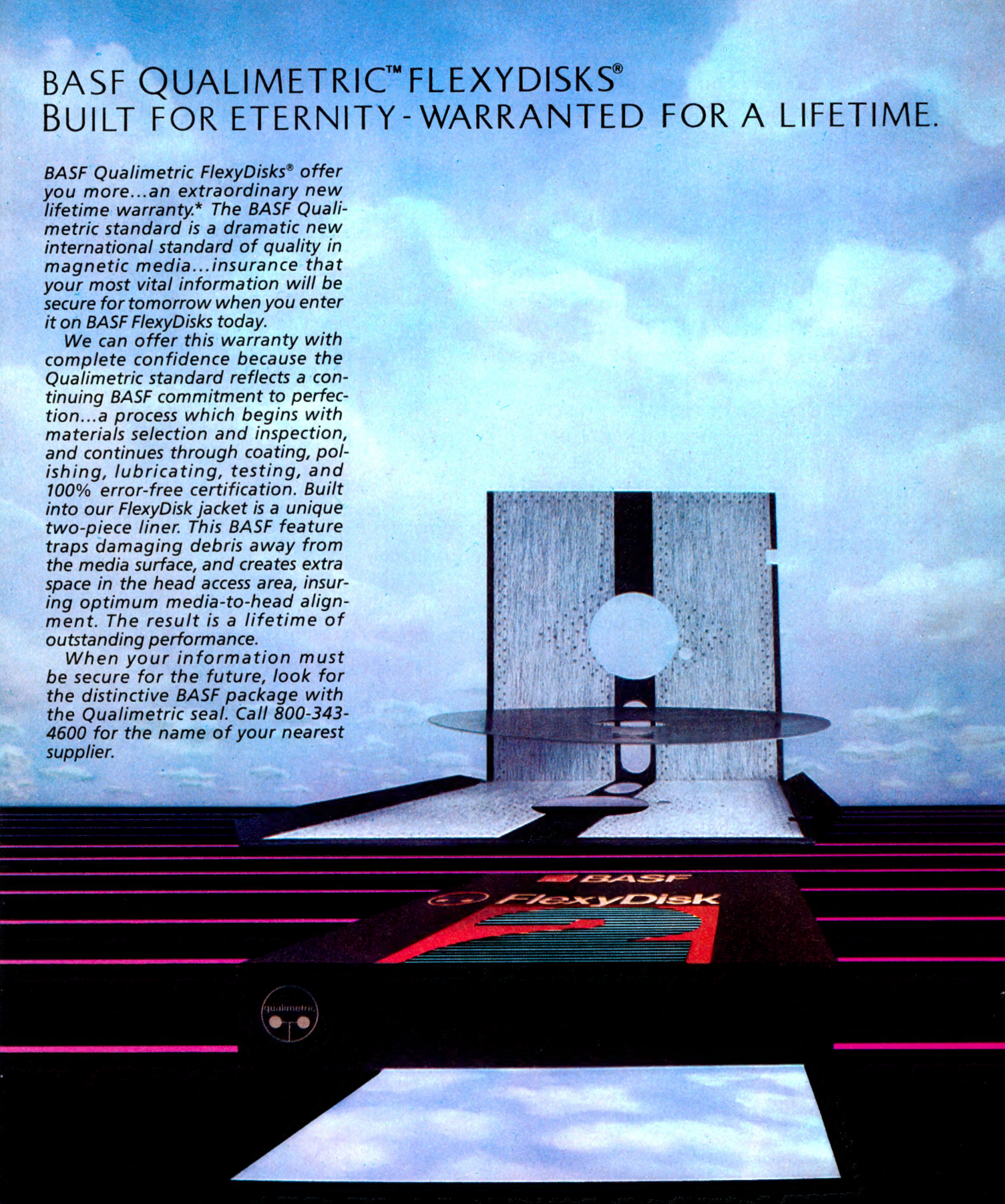

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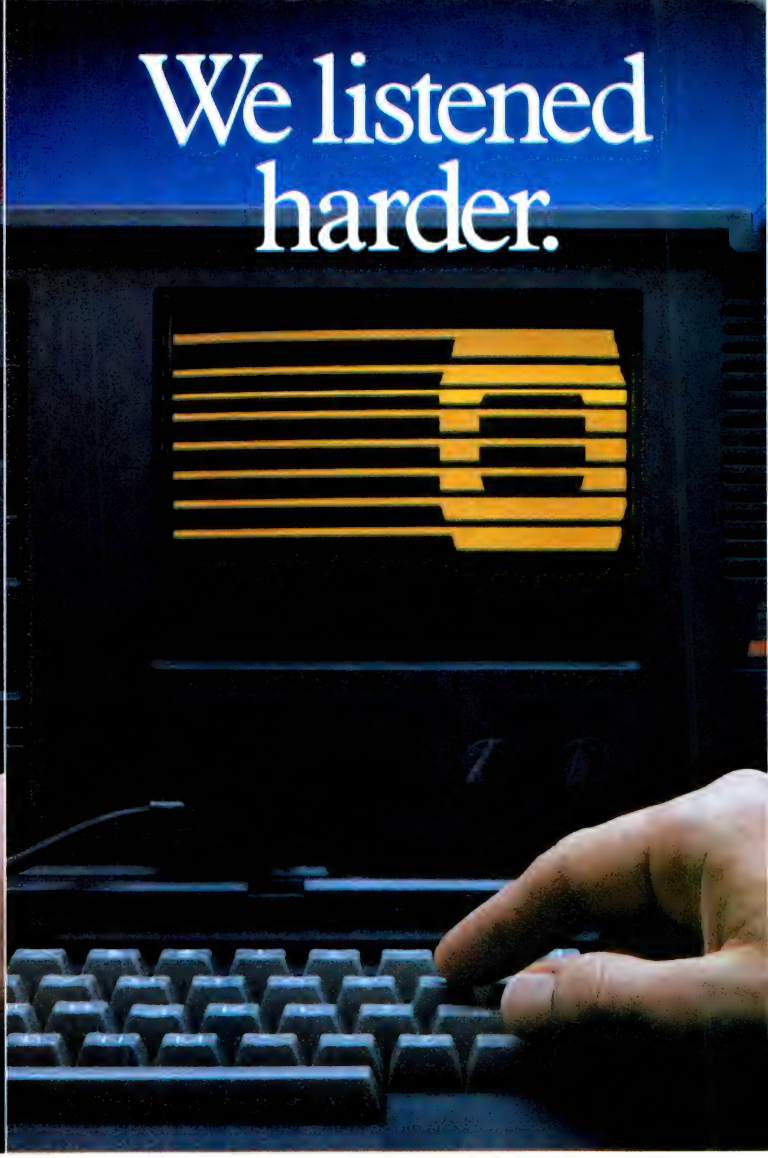

Introducing the new Osborne™ Executive™ Series.

We listened when you told us you wanted a personal business computer.

We delivered the Osborne 1.

And in the two years since its introduction, the Osborne 1 has become the largest selling portable business computer on earth.

We listened harder.

The result is the new Osborne Executive Series. Consider these new advantages:

☐ A big, 80-column, eye-easy amber display lets you see more of the information you're using, with less effort. ☐ Memory is expanded, for larger spreadsheets. ☐ The new Executive Series now includes a database system—Personal Pearl.™ (That's in addition to an already formidable list of standard Osborne software, including word processing and electronic spreadsheets.) ☐ Terminal Emulation provides access to information stored on other computers. ☐ IBM Personal Computer™ compatibility (on the Executive 2) lets you use software packages designed for the IBM system.

And there's much more.

Add up the value of all the hardware features and software systems included with either the Executive or Executive 2 and you will see that the sticker price is one of the incredible bargains available in personal computing.

Visit your local authorized Osborne dealer. Once again, Osborne has set the standard for portable business computers.

For the name of your nearest Osborne dealer, dial (800) 772-3545 ext. 905 (in California); (800) 227-1617 ext. 905 (outside California).

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COMPUTER CORPORATION

CIRCLE 6

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How to quickly re

If you'd like to turn the agony of small business bookkeeping into the ecstasy of total control, you've come to the right place.

Because even if you're starting with a shoe box full of invoices or a pile of checks hiding under a pile of deposit slips, we can tell you how to centralize, organize and monitor all that information, and manipulate it in ways that will make your business a pleasure—all with an Apple® III Personal Computer.

Attain instant financial status.

An Apple III, teamed with the BPI General Accounting Package, can put every basic accounting function right at your fingertips.

Technically, that means General Ledger, Accounts Payable, Accounts Receivable and Payroll—all in one package.

Meaningfully, that means you can turn numbers into answers.

With BPI, your Apple III can give you a snapshot of your company's financial condition, an up-to-the-instant balance sheet. It can also generate instant and detailed reports

gain your balance.

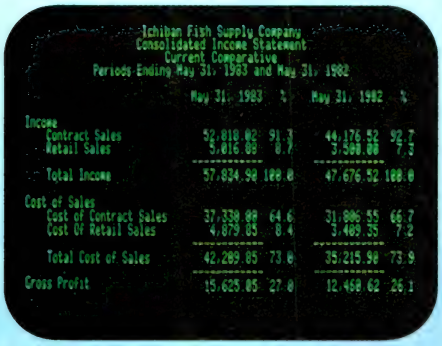
on your customers and vendors.

So you know who owes whom, how much, and how come.

And just how well your cash flow is flowing.

And where to give credit where credit is due (a customer inquiry feature allows you to make credit decisions based on the most current information).

You can also list your purchases by discount dates. And take advantage of them in no uncertain net terms. You can even keep payroll records without paying more, because it's part of the same package.


Ichiban Fish Supply Company
Consolidated Income Statement
Current Comparative
Periods Ending May 31, 1983 and May 31, 1982
May 31, 1983 % May 31, 1982 %
Income
Contract Sales 52,810.80 91.3 44,176.52 92.7
Retail Sales 5,016.05 8.7 3,500.00 7.3
Total Income 57,824.90 100.0 47,676.52 100.0
Cost of Sales
Cost of Contract Sales 37,330.80 64.6 31,806.55 66.7
Cost Of Retail Sales 4,879.05 8.4 3,409.35 7.2
Total Cost of Sales 42,209.85 73.0 35,215.90 73.9
Gross Profit 15,625.05 27.0 12,460.62 26.1

Your Apple can generate instant income statements (with expense ratios) or balance sheets, and let you compare them to last month's or year's, then print them out to suit your banker.

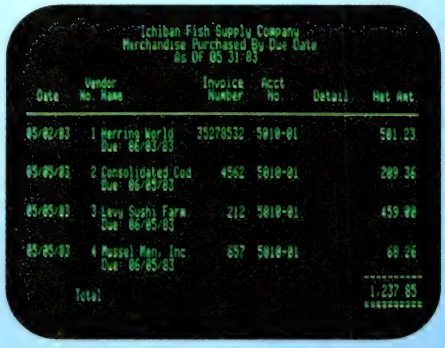
Profit from history.

In business as in life, experience is the best teacher. And the Apple/BPI system can provide you with instant comparisons of this-month-this-year vs. this-month-last-year, or this-year-to-date vs. last-year-to-date.

So you can quickly spot changing expense ratios and make decisions with 20/20 foresight.

The BPI General Accounting Package also lets your income statements be coded by location, department or product line. So you know where your money's coming from.

And where it's not.


Ichiban Fish Supply Company
Merchandise Purchased By Due Date
As Of 05 31 83
Date Vendor No. Name Invoice Number Acct No. Detail Net Amt
05/02/83 1 Herring World 35278532 5010-01 501.23
Due 06/01/83
05/05/83 2 Consolidated Cod 4562 5010-01 289.36
Due 06/05/83
05/05/83 3 Lovy Sushi Farm 212 5010-01 459.00
Due 06/05/83
05/05/83 4 Mussel Man, Inc 857 5010-01 68.26
Due 06/05/83
Total 1,237.85

It can also allow you to take full advantage of merchandise discounts. So you'll know whom to pay, when to pay, how much to pay—and save a lot of clams in the process.

Make a timely statement.

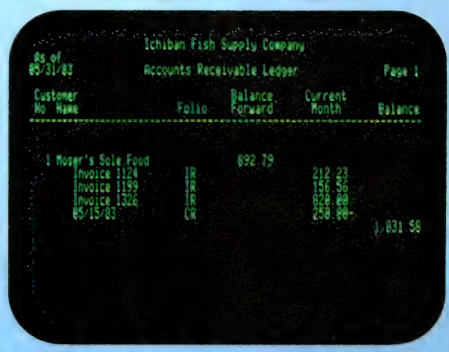
Add an Apple Dot Matrix or Daisywheel printer to your Apple III, and you can print out your entire balance sheet in minutes.

Or any number of reports, from cash receipts to payroll ledger to income. You can even print checks and customer statements.

The impressively professional results will make an important statement to everyone you deal with—including your banker.

More ways Apples pay.

There are more people in more places doing more things with Apples than with any other personal computer in the world.



To avoid fishy transactions, you can instantly display customer's payments, charges and current balance. In this case, a few more cans of tuna would put Mr. Moser over his $2,000 limit.

Because for one thing, there's more software for Apples than for any other personal computer in the world. So the same Apple that handles all your accounting needs can also handle financial spreadsheets, word processing and electronic filing.

You'll also find programs that are designed specifically for your kind of business. Be it dentistry, architecture or swine herding.

Of course, the best way to learn all the ways Apples can help you make better business decisions is to visit any one of over 1500 authorized Apple dealers.

So drop in. For a full account.

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CIRCLE 4

"Choosing a about as Until I

"Six months ago, I started shopping for a personal computer.

It was not a pleasant experience.

Half the sales people sized me up as "low tech" and avoided me like the plague. The other half said things I couldn't understand, showed me machines I couldn't operate without taking a computer class, or gave me demonstrations that had absolutely nothing to do with my business.

I was confused. I was embarrassed. I began to feel like a technological Quasimodo.

TECHNOLOGICAL QUASIMODO

But I was still determined. So I called this friend of mine—Bob Goldman—who's been into computers for years.

"Bobby," I said, "Help!"

He said, "Relax. They've finally built a computer that demands nothing but delivers everything. The Epson. And the only language you need to operate it is the one you've already shown a reasonable mastery of: English."

EPSON???

As usual, Bobby knew what he was talking about. It seems that Epson has become something of a legend in the computer industry by making the world's most reliable computer printer. Today, one out of every two personal computer printers sold worldwide comes from Epson.

Now they've turned their attention to the computer itself. And have engineered a breakthrough that has caught the other computer companies completely off guard.

STATE-OF-THE-ART SIMPLICITY.

That's the best way you could describe the Epson. For instance, the crystal sharp resolution of the screen provides amazing graphics capabilities. (Anyone who's tried to draw a circle and gotten something resembling an octagon knows how important that can be.) Yet, despite its double-density disk drives and powerful 256k memory, you don't have to know anything about computers to use the Epson.

No "computerese" to learn. No artificial routines to memorize.

All you have to know is *what you want.*

THE ERA OF PUSH-BUTTON WORK HAS FINALLY ARRIVED.

Across the top of Epson's keyboard is a row of keys labeled in simple English.

Each key does exactly what you'd think it would do.

If you want to draw a graph, for example, you press "Draw." Step-by-step, the Epson asks you what kind of graph, where you want the title,

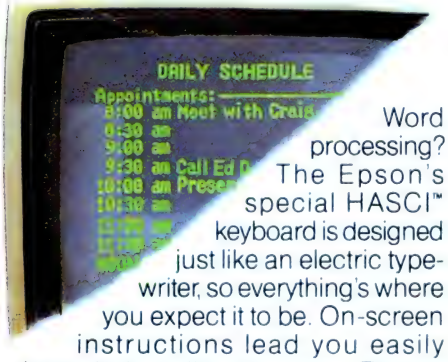
personal computer was much fun as having a root canal. discovered the Epson."

how many bars or slices it should have, and so on.

When you're done answering the questions, it displays the finished graph.

You smirk.

Hit the "Schedule" key and up comes today's electronic appointment calendar, ready for you to check your meeting schedule, make appointments, jot down notes, or update your things-to-do list.



Word processing? The Epson's special HASCI™ keyboard is designed just like an electric typewriter, so everything's where you expect it to be. On-screen instructions lead you easily through the editing process. There's even a "Help" button to bail you out if you get in trouble. Best of all, if you do manage to make a mistake, you simply push "Undo" to back up a step and start over.

In less than a day, I was banging out error-free letters and perfect reports. All of which I was filing *electronically.*

ELECTRONIC FILING, ALONE, MAKES THE EPSON WORTH ITS WEIGHT IN GOLD.

When I finish writing something, I touch "Store." My Epson asks me what I'd like to call the document, then lets me file it away by using up to 16 words.

I could, for instance, file a letter under the title "Letter to Bob Goldman thanking him for recommending the Epson and inviting him to dinner Saturday."

The letter can then be instantly retrieved by telling the Epson to look for "Letter to Bob Goldman," or just "Bob," or even "Saturday dinner." It automatically searches through a vast electronic file drawer to find the letter – using whatever slight bit of information I can remember.

Very slick. Very useful. And nothing like the cumbersome file and retrieve codes demanded by other computers.

In fact, the Epson is so easy to use and undemanding that it's hard to believe that you're on the leading edge of technology.

Yet that's exactly where I find myself. In one day, I was tearing through my work – while guys who've had computers for months (even years) were still tearing through their instruction manuals.

In one day, I was doing more work, faster, and *better* than I ever thought possible.

In one day, this low technology man had caught up with the computer age!

Bobby. . . Epson . . . it's a nice age. I thank you both."

Naturally, the Epson is expandable to whatever degree of complexity you choose, and accepts a full line of CP/M® software. But for a base price of less than $3,000 it does far more tasks than could possibly be covered here (like sending and receiving electronic mail, juggling complicated travel itineraries, etc.). Rest assured, however, that these are not separate programs you have to buy. They all come with your Epson.

Epson also has a national service network that provides technical support, advice, and information. For a free brochure, or the name of your nearby Epson dealer, call toll-free (800) 421-5426. California residents call (213) 539-9140.

EPSON

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CIRCLE 5

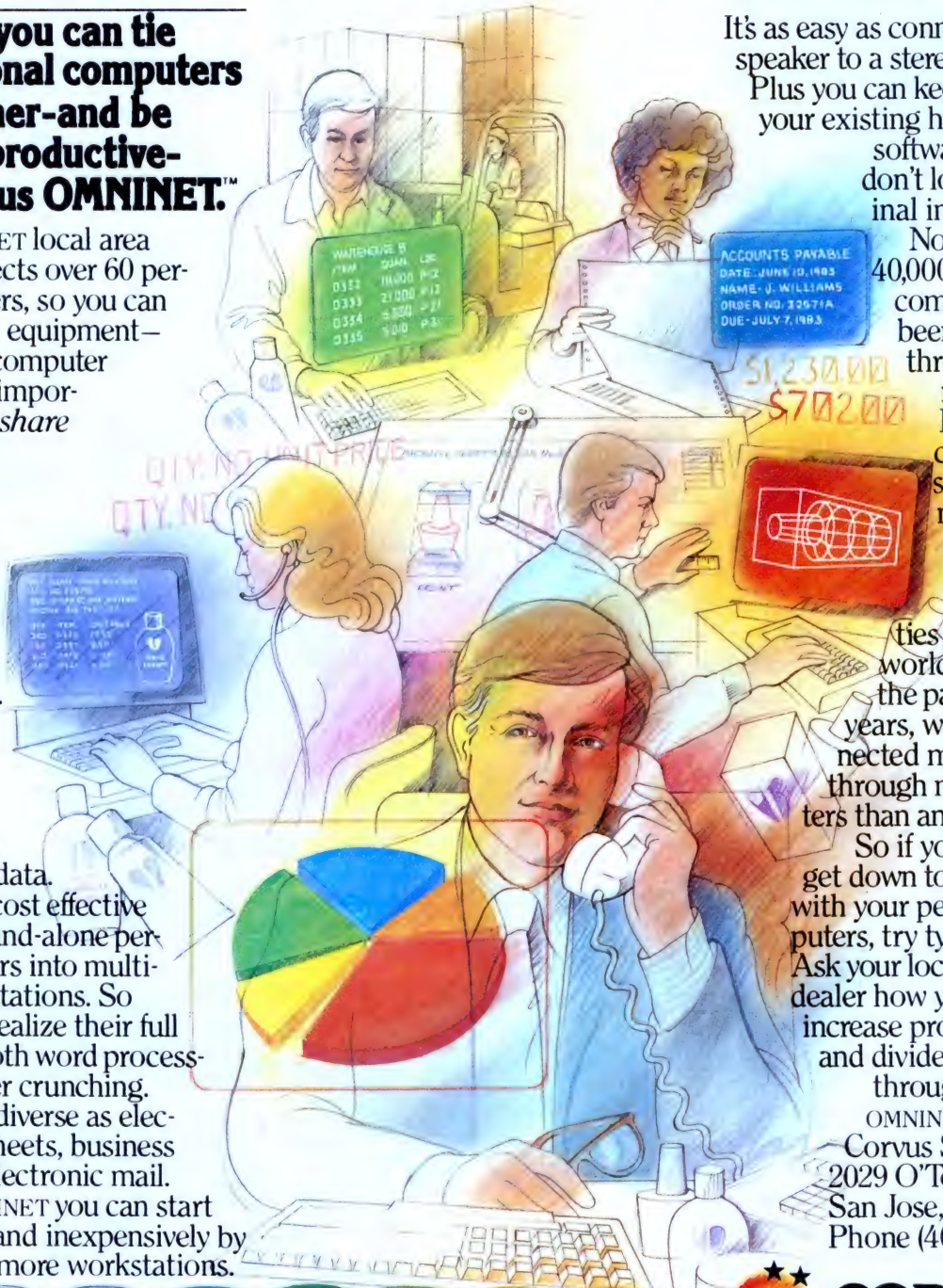
HOW TO GET MORE DONE BY TYING UP YOUR PERSONAL COMPUTERS.

Now you can tie your personal computers together-and be more productive-with Corvus OMNINET.™

An OMNINET local area network connects over 60 personal computers, so you can share common equipment—even different computer brands.* More importantly, you can *share the costs* of high-performance peripherals, such as printers and Corvus hard disks storing up to 80 million characters.

OMNINET also improves productivity by letting you share common programs and data. That makes it cost effective to turn your stand-alone personal computers into multipurpose workstations. So now they can realize their full potential for both word processing and number crunching. And things as diverse as electronic spreadsheets, business graphics and electronic mail.

With OMNINET you can start small, and expand inexpensively by simply adding more workstations.



It's as easy as connecting a speaker to a stereo system. Plus you can keep on using your existing hardware and software, so you don't lose your original investment.

No wonder over 40,000 personal computers have been connected through Corvus networks in Fortune 1000 companies, small businesses, professional offices and educational facilities around the world. In fact, over the past three years, we've connected more people through microcomputers than anyone else.

So if you're ready to get down to business with your personal computers, try tying them up. Ask your local computer dealer how you can increase productivity—and divide your costs—through Corvus OMNINET. Or contact Corvus Systems, 2029 O'Toole Ave., San Jose, CA 95131. Phone (408) 946-7700.

CORVUS SYSTEMS

Tying it all together.

*OMNINET currently ties together Apple II, Apple II CP/M, Apple III, IBM PC, and the Corvus Concept,™ and soon the NEC PC8001, DEC VT180, Zenith Z89/90 and Z100, S-100 bus computers, and TI Professional Computer.

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CIRCLE 9

Do More Keys Mean A Better Keyboard?

In this monthly column "Answers" we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, *50 Essex St., Rochelle Park, NJ 07662.*

Q: A lot of new computers have fancy keyboards with a lot of keys. Do they really help?

A: More keys don't necessarily mean a better keyboard. IBM has been criticized by some for the 93-key keyboard on its personal computer because it has keys in funny places. On the other hand, some people love the Personal Computer's keyboard. It's a matter of personal choice.

There are some things that make a good keyboard, though. First, it should be sturdy. You should be able to bang on it, with moderation, and not break it. It should have a solid feel—it makes you more secure when you use the computer. One new trend in keyboard design is palm rests. These are simply areas where you can rest your hands while you let your fingers do the walking. Try using a keyboard for a number of hours, and if it has palm rests, you'll be surprised at how often your palms wind up on the rests.

People who use typewriters will appreciate good tactile feedback. When you strike a typewriter key, you know it, because you feel the vibration caused by the movement of the assembly in striking the paper. Computers have no moving parts, so there's no inherent indication that a key's been struck. No tactile feedback can slow you down. Some key assemblies are fitted with a little pawl that makes the key click when it hits bottom. The effect is like a little backward push. When you feel it, you know the key's been pushed.

A keyboard with more keys usually has the extra keys dedicated to certain functions. These function keys have caused a certain amount of controversy in the industry, with some people calling them window dressing, and others swearing by them. A function key is simply one that's programmed to accomplish a complete function with one keystroke. A computer running CP/M might, for example, have a key which, when pressed, causes the machine to execute the DIR command, which will tell you the contents of the logged disk drive. If you didn't have the function key, you would have to type DIR, and then press the return key, a total of four keystrokes. All four strokes are programmed into the function key.

Q: When I loaded a file from our Apple III into our Apple II Plus via modem and tried to print it out, the computer stopped and now it won't print. What happened?

A: The same thing once happened to us. First we checked the printer. That was easy, because most printers have self-test functions; ours worked fine. We finally realized that the Apple III file's imbedded commands had thrown our printer/modem/clock controller card for a loop. Several multifunction accessory cards have battery-backed on-board RAM that maintains the configuration for the various functions, including the printer. We had to reconfigure our card, because many functions scattered throughout the configuration had become grossly altered. After we finished, it worked as well as ever . . . as long as we deleted the Apple III file's imbedded commands before we tried to print again.

Q: What's the difference between a network and a multiuser system?

A: Architecturally, they're quite different, but they perform the same functions.

A network is a collection of computers which are hooked up to one another, and usually to some shared peripherals as well. Users on a network have their own computing resource, and they can also get to the resources they share with others on the net. One station on the network is the controller; this station functions primarily as a traffic cop. If two stations start to transmit at about the same time, the controller sorts out who has priority, and allows that message to go, telling the other station it has to wait.

A multiuser system, on the other hand, is one computer with many terminals hooked up to it. Each terminal can access the central system.

The central computer is the controller in this situation. It decides which task will get executed, and which has to wait. Since it has a limited amount of memory—memory isn't infinite—it can only have a certain number of tasks active at any one time. That means the more users who come on line, the more each user will have to wait to get his work done.

That's the principal operational difference between a multiuser system and a network. In the network, the only waiting is for communi-

(continued on page 19)

Thank god

Business at Bundtweiller Brass Beds is booming! And now that Friday's here to help out, I've got everything under control.

Friday's the revolutionary new microcomputer information management system from Ashton-Tate, the people who invented dBASE II™

It came in Tuesday, and it took me almost no time at all to get the hang of it because Friday works *with* me, not against me. I've already turned stacks and stacks of paper files into much more efficient "electronic files." And it's so easy to use that even Mr. Bundtweiller can do it.

So now, no matter what Mr. Bundtweiller needs to know—no matter when he needs it—he or I can find it in seconds.

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The total number of #3455 Brass Beds sold year-to-date, by region.

A quick report on our cash receivables.

Or the special report for the Board of Directors meeting this afternoon. Mr. Bundtweiller forgot to tell me about it until just before lunch, but Friday and I got it done in no time at all. It looks gorgeous!

Friday even knows how to keep private or confidential information to itself unless I ask for it using a special password.

Friday's helped me say goodbye to paper shuffling forever. It's terrific for inventory and invoices and paychecks and input screens and reports. It works with dBASE II™ and 1-2-3[1] and Wordstar[2] files. And the way it handles mailing lists and labels is just fantastic.

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it's Friday!™

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CIRCLE 10

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With built-in Enhanced BASIC you can write programs to your specific needs. Or use our library of preprogrammed software for engineering and scientific applications — on Solid State Software or Wafertape cartridges.

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TEXAS INSTRUMENTS

Creating useful products and services for you.

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(continued from page 15)
cations time. In a multiuser system, the wait is for execution. As multiuser systems reach the limit of the users they can serve, waiting times may prove unacceptable.

Q: Recently you said it was easier to program in FORTRAN and other complex languages than in BASIC. Is that right? I always thought it was the other way around.

A: It's easier to program in BASIC, provided you don't want to do too many esoteric things. The letter B in BASIC stands for Beginner's, and that's just what it means. You can get started programming quickly in BASIC, and there's a lot you can do. But depending on the BASIC you have, there are some things you won't be able to do.

I cut my programming teeth on a language called ALGOL W, a subset of ALGOL 60. ALGOL 60 was, at the time, a very popular language in Europe, and the version we used was easier to use for programming instruction. But it wouldn't do some things, like let you format your output, for example, without Herculean efforts. I still used it, until I ran into a professor who groused so much about my sloppy printouts that I had to teach myself FORTRAN. I could format my output in FORTRAN, but I couldn't define blocks of code for execution, and that made FORTRAN harder for me.

When I was introduced to the personal-computing world, I had already done some programming in BASIC, so I figured it would be a snap. But the BASIC I have doesn't have blocks, either. It also doesn't have some common features of other languages, like rounding, or double precision. (Again, I'm talking about the BASIC *I* have. Others may have some or all of the features I miss.) It also doesn't have convenient output formatting. File handling can be a chore in BASIC. The list goes on and on.

Other languages have considerably harder syntax and tougher grammar, but that's because they do other things which are easier to do when using more complex languages. COBOL, for instance, is designed for file handling. If you have an application that has a lot of files, COBOL would be the choice.

The statement you're referring to, though, was a general one, that said something like this: In general, the higher-level languages are easier to use. That's still generally true. BASIC is easier than assembler, and, I think, FORTRAN is easier than BASIC. People tell me Pascal is an even easier language, and FORTH is supposed to be a dream. But it all depends on your situation.

Q: Is there anything my computer can do on its own, without special software?

A: Yes, but not a lot. Let's take the Apple II as an example. Inside that computer is a ROM that contains the instructions the microprocessor needs to interface with the keyboard and the display. The ROM also includes BASIC. You can get to BASIC and do some things in the immediate mode, like printing the result of an addition, but that's about all.

Alternatively, you can get to the monitor ROM and call various machine language subroutines that clear the screen, print a character, and so forth. But these functions aren't very useful.

Some computers, like the IBM Personal Computer, have a resident operating system that contains more functions than the minimal set mentioned. The IBM, for example, has a key that causes a dump of any information listed on the screen to the printer. So the IBM computer can be a simple word processor without the addition of any further software.

In general, though, you need packaged or home-brewed software to make the computer really useful.

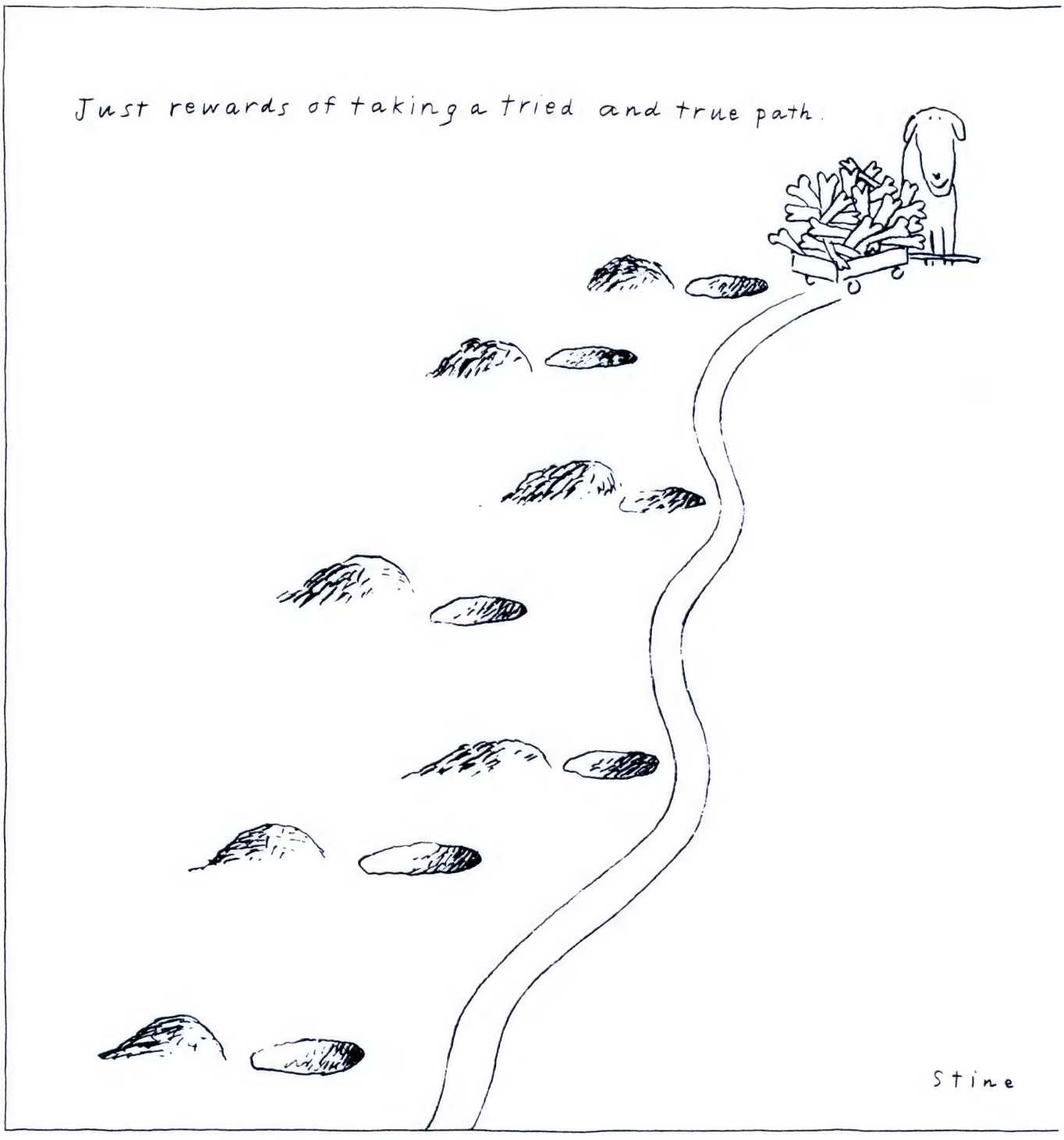
Q: What are the trade-offs in black and white, amber, green, and color displays?

A: Black letters on a white background duplicate ink on paper, so it looks the most familiar. But computer monitors tend to flicker when generating a large, light colored background. When evaluating such a display, be sure to check for flicker. It also takes a lot of computer power to maintain such a display, so be prepared to pay for such a feature. White on black is still common, but there is general agreement that green or amber displays cause less eyestrain over long periods. This was investigated decades ago when the Navy was researching ways to signal landing aircraft from carrier decks. One outcome of such research was the now familiar, green and white highway signs. Apparently the sharp contrast between black and white is hard on the eye's discrimination capabilities. Softer contrast of the green and amber monitors works better.

We've heard that amber phosphors don't last as long as green ones, though we haven't seen proof of this. Some European researchers give amber the edge, but it is true that green, being a "cooler" color, may prove more restful.

Color displays are great for color, but never as good for text work as a quality monochrome monitor. Don't let the ads fool you—the best RGB (red, green, blue) monitors are amazingly sharp, but we've never met anyone who does much word processing who wouldn't opt for a monochrome display. One compromise is to get a good, relatively inexpensive composite monitor—which admittedly has less resolution and color intensity than an RGB display—and a monochrome monitor. The combina-

(continued on page 22)



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CIRCLE 11

(continued from page 19)
tion would still cost less than an RGB, and many monitors have provision for daisy-chaining several monitors to one computer connection.

Q: As a Commodore 64 owner upset about the lack of software available, I have been excited by the rumors and ads for an Apple loader and an adaptor for Atari 400/800 cartridges. Do these items exist, and if so, how well do they work?

A: We checked with Mike Neelan at the Commodore Computer Center in San Jose, Calif. Basically, Neelan says, none of the rumors have turned into practical products. He's seen an Apple loader, but it only loaded programs written entirely in BASIC. However, most popular Apple software is written—all or part—in lower-level languages like assembly or machine language, or it's written in different higher-level languages, such as Pascal.

Neelan says the Atari cartridge loader rumors haven't panned out either. Atari has vigorously opposed infringement on their copyright, so such a product could have real legal hurdles to overcome.

Neelan has some words of encouragement, however. He points out that it took over a year before good software—in quantity—began to appear for the Apple and Atari computers when they came out. And now he's seeing products for the 64 finally arriving in some numbers, so Neelan advises 64 owners to hang on.

Q: Is there a system that can display and print Hebrew letters? Hebrew is written from right to left.

A: We don't know of any system that allows you to enter letters from right to left, but some minicomputer and terminal manufacturers have foreign character sets, and Hebrew might be one of them. Alternatively, you might find someone who's really good at programming display controllers, and have him try to rig up something for you. (Your computer dealer might know of a good computer-hobbyist programmer who could do it.) It would be a matter of getting the cursor on the display to move from right to left instead of the other way around. You'd also have to get a read-only memory to store the characters, a keyboard that would let you redefine the characters, and word-processing software that would know what the Hebrew characters meant.

Once you get the text in, printing it is easy. Many printers print bi-directionally, which means they print from left to right or from right to left. So assuming you had the characters, and a printer and software that understood what they meant, printing right to left would be the easiest part of the whole thing.

Q: Some portable computers have magnetic-bubble storage, but they are expensive. Is magnetic-bubble storage a good thing to have?

A: Yes, it is, but it may not be worth the price. When the bubble devices were invented several years ago, some people in the industry predicted they would kill rotating magnetic storage devices—floppy and hard disks. It hasn't happened, though, because as the cost of manufacturing the bubble-device dropped, the cost of disks and drives dropped even faster, and that's a trend that appears to be continuing.

The reason for putting bubbles on portable computers in the first place is their non-volatility. When you turn the power off on a bubble, it makes absolutely no difference to the data stored therein. Everything stays just the way it was before the power went off, maintained by the field of a permanent magnet.

There are cheaper alternatives. One is battery-backed-up, low-power RAM. These RAM chips draw so little power that a computer can keep them energized on a small battery for a long time. Manufacturers' brochures can give you the specs. Another option is the data cassette. Many portable computers have these very tiny cassette drives built-in, and they, too, will provide the non-volatile storage you'd like to have in a portable computer. Some argue that this approach is better, because it allows you to store data on removable media (like floppy disks), and thus have more room in RAM for programs.

Q: What's the deal with 3-inch floppy disks? Should I get some for the computer I want to buy?

A: Some manufacturers think you should. In fact, they believe in it so passionately that there are at least four different kinds you can buy. The computer industry is presently locked in controversy over which design should be the standard.

It's not likely that a standard will emerge until at least the fall. Several months ago, people were predicting that one would appear before you read this, but at this time it's doubtful. So for our money, you would do better to look for a more standard-size $5\frac{1}{4}$- or 8-inch floppy disk drive.

These have some disadvantages, however. Because they're bigger, they're tougher to transport. They also don't pack data as tightly as the smaller disks, so you get less data for your space. And they're easier to damage than the 3-inch disks, which are housed in a rigid case.

The advantage is that there's a wide variety of software available on the larger disks, so your choices of software are expanded if you have that type.

If you still want the 3-inch floppies, make sure the vendor you buy them from has the software that you need. And, be aware that the medium you select may not be picked as the standard. If that happens, you'll be

(continued on page 26)

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PC 883

(continued from page 22)
out in the cold for future software. Your manufacturer may continue to support his format, but it's not likely anyone else will.

Q: I've been trying to program some games in BASIC on the Commodore 64, but they're too slow. Do I need to use assembly language, and, if so, how can I learn about it?

A: BASIC is BASIC, and it's slow. You can do some things to make it faster, like making sure you have no irrelevant statements in the program, making sure subroutines are where the computer can find them quickly, and the like, but after you do all that, you're still stuck with BASIC. With the 64, that probably means you will need to generate machine-language programs. There are several ways to do this, but practically speaking, it will probably mean either writing in assembler or in the machine-language itself.

The best place to get more information is from your dealer, if it's a computer store, or from Commodore.

Q: What else can I use a spreadsheet for besides budgets?

A: What about your income taxes? That's what I did this year. I simply used the first two columns in the sheet for the labels of the line items in the forms. Then I went to every cell opposite a line number and entered a 0 or a formula, whichever was appropriate. I did that for the federal form, schedule A and B, and the state tax forms I have to fill out. Then as banks, loan outfits, my company, etc. sent the income and deduction information, I filled in the blanks. As the line items were filled in, they were transferred to the appropriate places where that information had to be entered. For example, the New Jersey tax form requires you to enter your income as it appears on your federal return. Once those income figures were on the federal part of my spreadsheet tax form, the items were automatically entered on the New Jersey form as well. The same held true for other items.

If you set up a spreadsheet like this, you only have to enter the data once. All the calculations are done from that one data entry. Of course, you may have to go to a table to find your tax. And then you have to fill out the real forms. But if you print your tax spreadsheet, filling out the forms is just copying information from the printout to the tax forms.

Q: I own a two-year-old computer, but now everyone is talking about the IBM Personal Computer, because it's a 16-bit computer. What good would it do me to buy one of the 16-bit machines?

A: You'd be able to access more memory, and that's really about all. The 16-bit designation refers to the length of a "word" the computer can process. The word length is a direct measure of the memory the computer can directly access. Eight-bit computers (almost all the older ones are) can directly access 65,536 bytes of main memory. Sixteen-bit computers can directly access 1 Mbyte (more than one million bytes) of memory.

Additional directly accessed memory gives you the ability to run more complex programs. That's why it took the introduction of a 16-bit computer to fuel the development of the integrated packages like 1-2-3 from Lotus Development, and MBA from Context Management. Those programs need the memory that a 16-bit computer can provide.

Other than that, a 16-bit computer looks like an 8-bit one. The difference in speed in negligible, principally because personal computers are I/O bound: They spend a lot of time waiting for people to do something. The processor can get things done quicker, but it spends so much time waiting that you can hardly see the difference.

Therefore, the only reason to get a 16-bit computer is to run software that will only run on those machines. And that's a decision you'll have to make for yourself.

Q: Why do people say you should use a monochrome monitor for word processing?

A: The picture is better when you're displaying characters on a monochrome screen than when those same characters are shown on a color monitor.

That's a general statement, and like all general statements, its truth varies.

Color monitors use three different electron guns to project the color picture on the screen—one for red, one for blue, and one for green. The guns have to be "aimed" by electromagnetic coils around the neck of the picture tube so the green beam, say, hits the dot of green phosphor it should on the screen. If the aim of any of the guns is a little off, then the beams hit phosphors they shouldn't hit, and the result is a picture that displays color when it shouldn't, or the wrong color. Try it on your TV picture tube. If you have a cable service, chances are one channel displays local community news in letters made up of dots, just like the letters on your monitor screen. If you look closely at the letters on the TV screen, you'll see some that should be white but have other colors in them. This effect is particularly pronounced at the corners of the screen, and it's called "misconvergence." It's easy to aim the guns at the middle of the screen, but the beams have to go through some pretty wild bends to hit the corners. The more the bend, the worse the convergence.

When you use such a screen for a monitor, misconvergence can be a

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CIRCLE 13

IF YOU'RE CONFUSED ABOUT BUYING A PERSONAL COMPUTER, HERE'S SOME HELP.

Computers come in two parts.

One part is the "hardware," the machinery itself. The other is the "software," which tells a computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything. And vice versa. You have to buy both.

Buy the software first.

Since the reason you're buying a computer is to get the capability the software gives you (remember it's the software that tells the computer what to do), it makes good sense to pick the software first.

Start by making a list of the things you want the computer to do. Possibilities include word processing, inventory control, accounting, graphics, recordkeeping—you name it, there's probably software that does it.

Next take your list into a computer store and ask the salesperson to demonstrate software that will do the things you want.

Even though you'll need a computer for the demonstration, keep in mind the computer is just a vehicle. The software is the driver. Once you've decided on software, picking the rest of the computer system will be that much easier.

The simpler the better.

Some people will tell you that software has to be complicated to be powerful. Nothing could be further from the truth.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you want to do without getting in the way.

Good software keeps the complications in the computer, where they belong. And keeps the capability at your fingertips. It's that simple.

Simply see for yourself.

You can read any number of interesting books and magazines about personal computers. You can ask your friends who have them.

Or look at all the sales literature you can get your hands on.

But as helpful as that can be, there's no substitute for a live demonstration.

When you do go shopping, we recommend you take a look at the PFS® Family of Software.

Designed the way we think a software family should be: simple, straightforward and powerful.

Currently there are four software packages in the family: PFS:WRITE, PFS:FILE, PFS:REPORT and PFS: GRAPH, with more on the way. Here's a little more about each of them.

PFS:WRITE. The simplest way to get your message across.

PFS:WRITE is ideal for people who want to make their writing time more productive. It displays what you write on your computer screen so you can make revisions as you compose.

With WRITE, you can correct misspellings or substitute one portion of text for another, with just a few keystrokes.

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WRITE also works with most popular software programs, including the PFS Family of Software.

This feature allows you to add names and addresses from mailing lists to generate form letters. Or combine columns of numbers or graphs with your text.

PFS:FILE. The simplest way to get organized.

FILE is basically a paper filing system without the paper. So you can record, file, retrieve and review information in a fraction of the time it takes with a conventional filing system.

With FILE, you arrange your information on a "form" you design yourself. And when you need to track something down, FILE sorts through your records electronically. It lets you retrieve information in a variety of ways so you can be as selective as you want.

PFS:REPORT. The simplest way to sum it all up.

REPORT is a powerful analysis tool that works with FILE.

REPORT sorts through your files and retrieves the information you're looking for. Then assembles it all into one report, so you can analyze, plan and make better-informed decisions.

REPORT is also good at math. It quickly sorts through columns of numbers and performs calculations, so you won't have to.

PFS:GRAPH. The simplest way to spot trends.

GRAPH is ideally suited for professionals who need charts or graphs in a hurry.

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CIRCLE 14

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real headache—literally. It's tough to read letters that have color fringes around them. With a monochrome monitor, there's no problem, because there's only one beam, and a uniform phosphor coating. There can be no color fringing to get in the way of a clear picture.

Q: What is an 80-column card? I hear so much about it. Do I need one?

A: An 80-column card is a device which provides an 80-column display for computers.

Many people say that an 80-column display—a display that can show up to 80 characters on one line of a video monitor—is a must for word processing, since it allows you to see on your monitor what the document will look like when it's printed. Others maintain that an 80-column screen is nice to have, but not really necessary for most applications.

Eighty columns are primarily used in Apple II and IIe computers, and some have been added to Radio Shack TRS-80 Model IIIs. These computers come with 40- and 64-column displays from the factory. Popular models of 80-column cards are available for the Apple II Plus from Videx in Corvallis, Ore., and from other manufacturers.

One word of caution: If you're using a television as a video monitor, you're likely to be disappointed with the display from an 80-column card. The resolution of the average TV is too poor to allow 80 columns of characters to be read easily; you'd be better off buying a monitor.

Q: Can I use a modem at 1200 baud over ordinary telephone lines?

A: Any voice-grade circuit, which is any ordinary telephone line like the one coming into your house, can handle data transmission at 1200 baud. That figure, by the way, roughly translates into 1200 bits per second. At 8 bits per byte, it's roughly 150 cps.

If you want to go faster than that, you run into trouble. Data are transferred between mainframe computers at 9600 baud, but that speed requires telephone lines which are specially configured to handle that much information.

You don't need to worry about such high-speed transmission requirements, though. It may be feasible for individuals some time in the near future, but right now it's too expensive.

Q: We have Apple II computers. Our software is largely Applesoft BASIC. Our data fields are stored in ASCII under DOS 3.3. We would like to upgrade our software to a 16-bit machine like the IBM Personal Computer with MS-DOS. We hope to transmit our files and programs to the IBM Personal Computer so that we don't have to keypunch them all over again. Then we hope to edit our programs so that they can work on the IBM. How can this be done?

A: You can transmit the files and programs from one computer to the other with normal telecomputing software, using an RS-232-C cable to connect the two machines' serial ports. You can ask your dealer to make up the appropriate cable. Your telecomputing programs should have some means of converting programs into text files on the Apple end, and back into programs on the IBM end. Many telecomputing programs have this provision. Once your files are in the IBM, you shouldn't have much trouble re-editing them, as needed, to fit the IBM's format. The IBM and Apple use quite distinct versions of BASIC, however, and you may find it just as much trouble to re-edit the programs as to rewrite them.

Q: Recently, my BASIC programming instructor mentioned that video monitors are preferable to TV sets, not only for their finer resolution, but because the signal from the computer does not have to travel through the extra circuitry that televisions use for reception, and will therefore give a sharper display, free from interference. If that's the case, is it possible to bypass that extra circuitry easily?

A: It is possible to bypass the TV circuitry to use the TV as a monitor. But doing this conversion is complicated and potentially extremely dangerous.

The danger comes from the shock hazard of a TV chassis, which you're exposed to when you open up the set and have the power on—necessary for this operation. Most TV sets lack isolation transformers, and if their power plug is connected backward the chassis will carry the full 110 volts live. That's why TVs now come with plugs that have one prong wider than the other, and which impatient people defeat by using extension cords or old sockets that will accept the plugs either way. Portable TV sets usually have isolation transformers, eliminating this severe shock hazard.

But even if the plug problem doesn't daunt you, the work may. Bruce Carso of B&C Computervisions in Santa Clara, Calif., estimates that a repair shop would charge $50 to $80 to do such a conversion if you could convince them to do it in the first place. The job requires bypassing the tuner circuitry, as you surmised. You need a schematic diagram of your TV's workings. Using the schematic, you then locate the IF (Intermediate Frequency) strip at the video detector, where it pulls the information off the antenna. There you can inject a video signal from the computer, getting a broader band, higher fidelity signal than the one an RF modulator could

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CIRCLE 16

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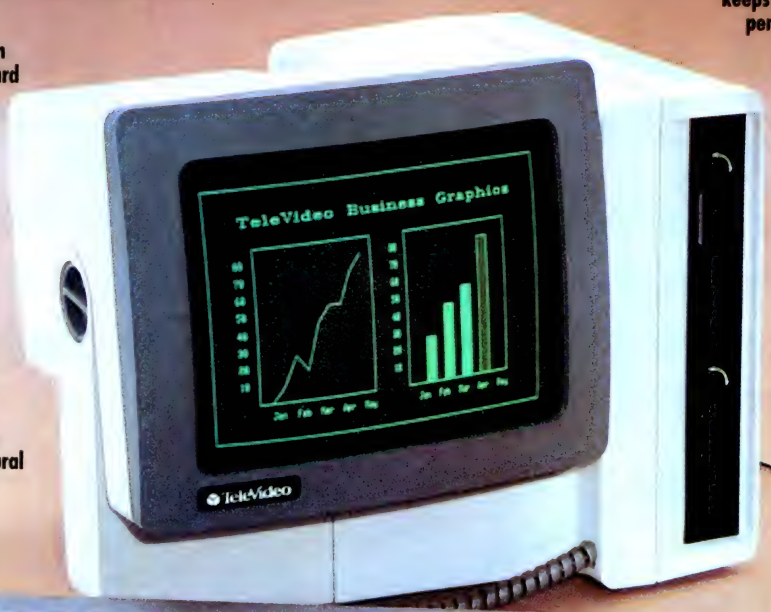

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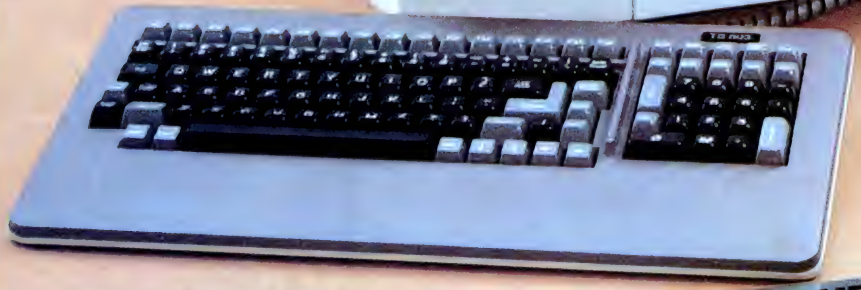

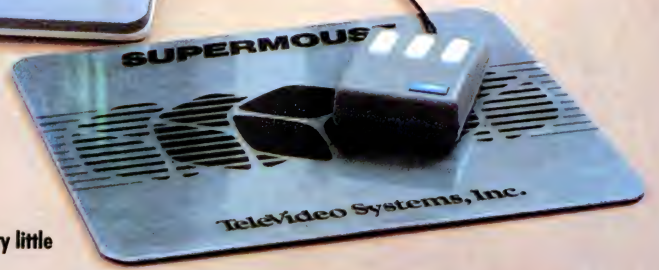

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CIRCLE 89

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feed into the TV. This might be worth doing for color work, given the cost of color monitors. But you'd have to know just what you're doing. For black and white work it doesn't make sense, given the low cost of some monochrome monitors now available.

Q: Is anyone thinking about making two different machines—one for computing with numbers, and the other for working with words? I'm interested primarily in home computers.

A: People have been making them for a number of years, but the dedicated word-processors they produce are very expensive. It seems doubtful that anyone will make these two different machines for the home, since personal computers function admirably as word processors. It's true that in most cases, you have to buy a printer to make the whole thing work, and if you want to print form letters, or mailing lists, then you usually have to buy other software. But the point is that the computer has this flexibility, and it can crunch numbers along with it. A dedicated home word-processor would be severely limited, and thus probably isn't very likely.

You can get an all-in-one computer, though. The Access, from Access Matrix Corp in San Jose, Calif., combines a computer, printer, modem, and bundled software for $2495. Call them at (408) 263-3660.

Q: Can you give me any information about a network for a small office?

A: Creating a network in your office is not difficult. However, the most economical type of network will depend upon the number of personal computers you will be using on the network. If you are using less than eight computers, you should look into a bus network. This is where a single cable is run throughout the office, and each computer taps into the cable using a hookup cable. Each computer must have the proper interface and software to participate in the network. For eight or more computers you should look into the star type of network. In this network, each computer radiates from a single microprocessor which controls the network. All the hardware and software necessary for a computer to join the network is contained in the microprocessor control center. Check with your local computer store and ask someone there to determine which network will fill your needs.

Q: How does a computer work? Can you explain, briefly, what the computer does?

A: Yes. A computer is really a simpleminded device. It can add and it can move numbers around. It understands instructions.

When instructions for such simple actions are put together in a logical order, the string of instructions causes the computer to add things and move information in such a way that something useful happens.

Let's look at an example. Suppose you wanted to add 2 and 2. You might tell the computer to do that like this:

```
PRINT 2+2
```

That's a BASIC statement the BASIC interpreter can understand and translate into a set of machine instructions. The actual machine-language commands wouldn't be much help here, so we'll put them into human terms:

1. Figure out what 2 is.
2. Load the result in the accumulator. (The accumulator is a special location for temporarily storing information inside the computer.)
3. Load the result in address 1.
4. Add the contents of address 1 to the contents of the accumulator.
5. Store the result in address 2.
6. Transfer the contents of address 2 to the output buffer.
7. Tell the video display to display the contents of the output buffer.

So you told the computer to add 2 and 2 and print the result, and the computer did it, by simply shifting data and adding. If you add more of these instructions together, then the end function gets more complex, and more useful.

Q: I have a question about file management software. I plan to purchase an Osborne computer, and my wife wants to use it to undertake a membership drive for a local non-profit organization. She wants to know if the software that comes with the Osborne can manage her files. She wants to build an 800-person mailing list with about six categories of information on each person, with a means of sorting out and creating a list of those who have not paid their dues. The lists should be printed using only names and addresses and not the administrative data also in each file. She also needs to print mailing labels from the various lists. If the software that comes with the Osborne will not satisfy these requirements, can any other programs do it?

A: Osborne representatives tell us that the new Osborne 1 and Executive now come with a data-base-management program called Personal Pearl, which will do everything you need. Furthermore, Osborne offers full support for the program, including a telephone hotline. Osborne also sells and supports one other data-base program, called dBASE II. This expensive, powerful, and complex program would also fill your needs. It would take more effort to implement, however—if your needs are truly limited to the ones described in your letter, you'd be better off using Personal Pearl. If you look at both these packages and find neither suits your needs, you might try programs not supported directly

by Osborne, but which run on that computer. You can get a list of such programs by writing Technical Support, Osborne Computer Corp., 26538 Danti Ct., Hayward, CA 94545. You're currently limited to CP/M-based programs that can fit within the memory and disk storage limitations of the Osborne you buy. But those who opt for systems with double-density drives will be able to use UCSD P-System-based software as well. At the time of writing, the P-System implementation on the Osborne was still being debugged, but it should be ready by the time you read this.

On the whole, there's a lot to be said for using software supported by your hardware manufacturer. It's easy for hardware and software vendors to point the finger at each other when you run into difficulties. How many times have long-term users heard the phrase "Sorry, I can't help you. That's a hardware (software) problem!" By sticking with Osborne's supported software you could save yourself a lot of trouble.

Q: What's the difference between a serial printer and a parallel printer?

A: Basically, it's a difference of speed. A serial printer is fitted with a serial interface which lets your computer communicate with peripherals by sending data over the communications line one bit at a time. Since it takes eight bits to make a byte, it takes eight bit-times (the time it takes to send one bit out to the line) to get one character out of the serial interface, or port.

A parallel printer, on the other hand, is fitted with a parallel interface which sends data a byte at a time. So parallel interfaces can handle data at about eight times the speed of serial interfaces.

Most parallel printers are dot-matrix printers, but fully formed character printers can be parallel printers, too. Most serial printers, though, are fully-formed character printers, like the daisywheel printers that are so common in personal-computer systems. Daisywheel printers normally operate at a maximum of 55 characters per second, or cps. Most parallel printers, as we've said, are dot-matrix types, and these operate much faster. Eighty cps is a slow speed for a dot-matrix printer.

Q: What is a CP/M system, and what does it do?

A: CP/M is a program that is one of a class of programs called "operating systems." CP/M stands for Control Program for Microprocessors. Like all operating systems, it provides a way for the microprocessor inside your computer to know what you want to do. It also implements instructions from your applications programs to system components, like a printer or a disk drive.

A CP/M system is a computer that runs the CP/M operating system. There's nothing special about such a system, except that there are a lot of applications programs that can run under the CP/M operating system, so if you have a CP/M system, your choice of applications software is very broad.

Q: I have my Apple II Plus in my attic. During the summer, conditions there become extremely hot. Will this affect my floppy disks?

A: Floppy disks will normally be affected by extremes in temperature and humidity. If the temperature in your attic is between 50 and 125°F, your disks are probably safe. The humidity should be between 8 and 80 percent. Beyond these ranges your disks are at risk. If your attic exceeds these safety limits, you can adjust both temperature and humidity by installing a climate control system such as air conditioning.

Q: I'm having trouble integrating a high-performance disk drive into my computer system. I bought a Tandon TM 100-4 to use with my Heath/Zenith H89, which already has two Siemens 5¼-inch drives (including the one built into the machine). I use two operating systems: CP/M 2.2.03 and H-DOS 2.0. My problem is that I have not been able to use the Tandon disk drive with the system. I have tried such software approaches as "BIOS 80" (a modification of Heath/Zenith CP/M from Livingston Logic Labs of Pasadena, Calif.). Do you know of any software, compatible with my system, that will permit use of my two types of drives simultaneously, and which will permit the 80 track drives to read 40 track disks.

A: The Heathkit Electronic Center in Campbell, Calif. has what appears to be your answer. Your operating systems and hardware are not designed to mix the two types of drives on one drive controller card. The Livingston software is an attempt to get around the problem, which involves the Tandon drive requiring a soft-sectored diskette layout and the Siemens drives requiring a hard-sectored data layout on the diskette's surface. However, Heath recommends solving this problem with a soft-sectored disk drive controller card, Model Z89-37, $299 at Heath/Zenith dealers. Add this card to your computer and attach the Tandon to the card.

Then configure your operating system one of two ways. The operating system is designed to recognize up to three hard-sectored and three soft-sectored drives. If the Siemens drives are to be your boot drives, you can assign them as logical devices A and B; C is unassigned, since you have no third hard-sectored drive. The Tandon then becomes device D. Conversely, if you want the Tandon to be the boot drive, it becomes device A; there is no device B or C; and the

(continued on page 43)

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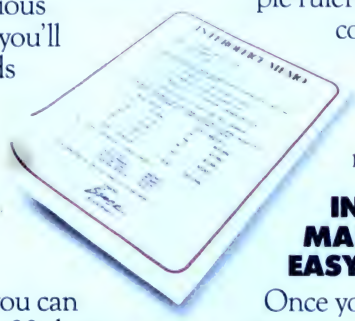

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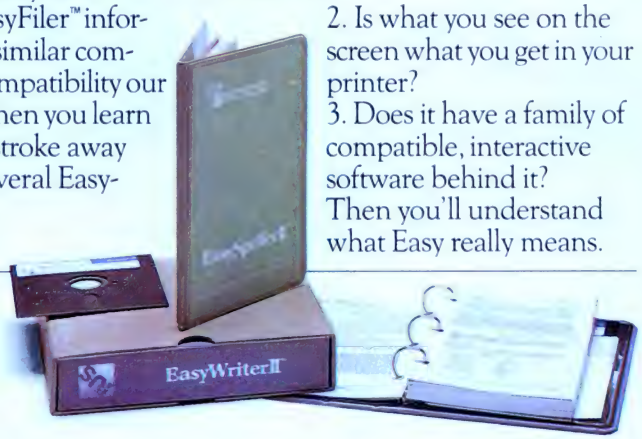

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CIRCLE 19

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CIRCLE 98

(continued from page 37)
Siemens drives become devices D and E. One advantage of this solution is that if you have trouble, you can go to your Heath dealer for help.

Q: Why should I buy an expensive computer with lots of memory when I can get additional memory for the computer I have?

A: That depends on the computer you have. If it's an 8-bit machine, it can only handle 64k of memory without some heroic software effort to support addition, over 64k. There isn't a lot of packaged software on the market that can take advantage of such a memory-management technique. So what happens is that some of the newer software packages that require a lot of memory can't use it in your computer even if you add the memory.

So it still comes down to the same questions. What software do you want to run? Will it run on your present computer? If so, will adding additional memory make it run better? If it will, then get the memory add-on. If not, you need to think about a computer with more memory.

Q: I have heard that disks can be used on two sides. If this is true, can I use the reverse side of my existing disks?

A: A conditional yes. Single-sided disks can be used on both sides, however the manufacturer of the disk may not stand behind the quality of the reverse side of the disk. To use the other side of the disk you must cut a write-protect notch in the opposite side of the disk jacket and punch a set of index holes opposite the original index hole in the jacket. Before you take a cutting tool in hand, check with your local computer store for a kit which will give you all the information you need to complete the modification successfully.

Q: What is a modem, and exactly what does it do?

A: A modem is a device that converts signals your computer can understand to signals capable of being sent over the telephone lines, and back again.

The digital signals of a computer can't get onto the phone lines, which were designed for voice transmission. Modulating the digital signal onto a voice signal makes the phone line think the computer has a human-like voice, so the line accepts it and sends it. Demodulating is the process of converting this signal back into a computer digital signal. Modem stands for Modulator/Demodulator.

Q: What are plated media? I read about them, but I'm not sure I understand.

A: Plated media is a term that refers to the way a magnetic coating is put onto a disk; plated media have a metallic magnetic coating which is plated onto the substrate. Ordinary media have a magnetic oxide applied to the disk.

People are leaning toward plated media because they can get a much smoother disk surface than they can with oxide coatings. The smoother the disk surface, the closer the read/write head can get to the surface. Close proximity makes for denser data storage, which means more bits per disk.

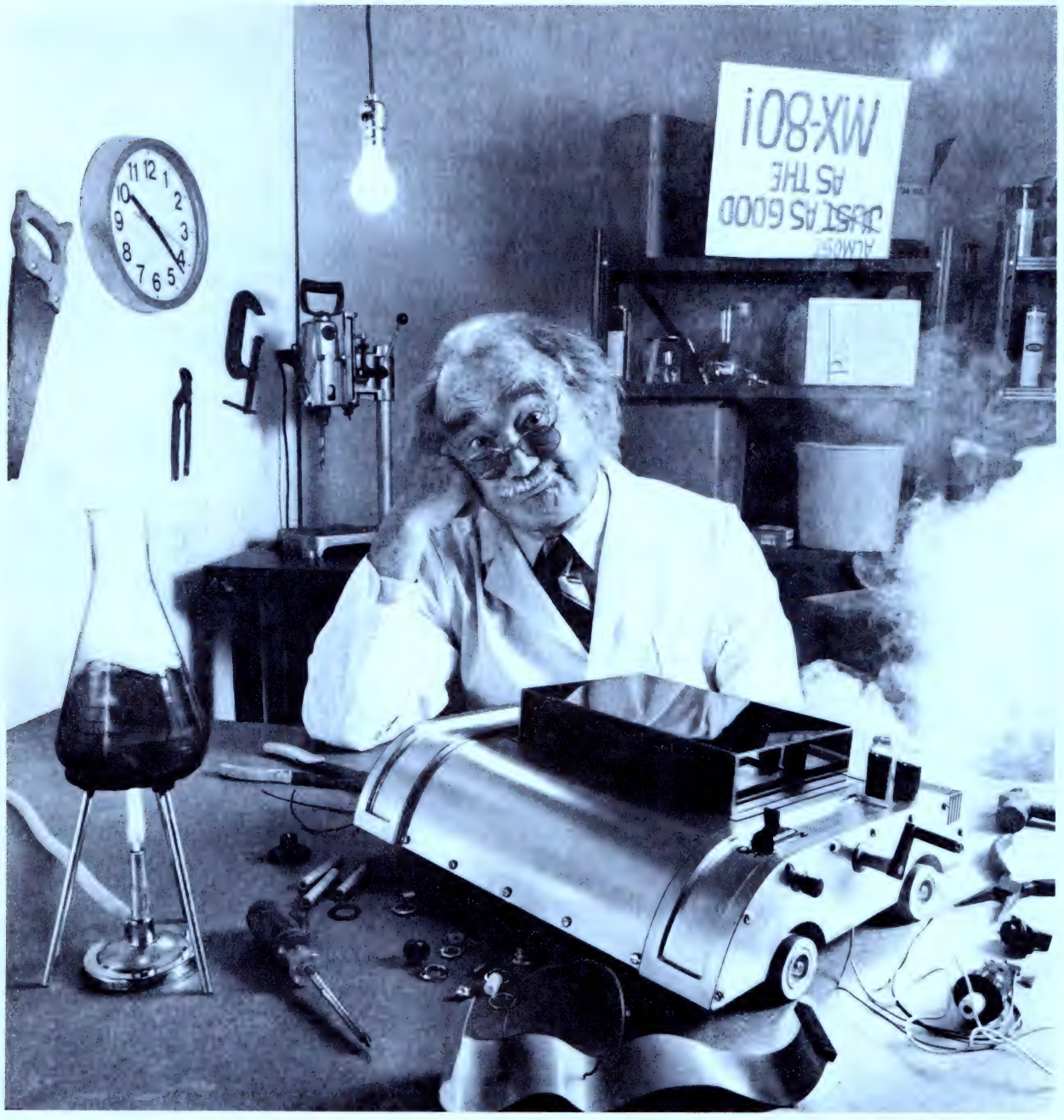
Q: I've been reading computer magazines for some time now, and I've come across an abbreviation which I have not been able to define; it's CSMA/CD. Can you help?

A: Try Carrier-Sense Multiple Access with Collision Detection. It's a mouthful! But unless you are involved in computer network interfacing, you probably would never come across the term. CSMA/CD is network protocol which allows your computer to transmit over a computer network when no other computer is transmitting. During your computer transmission, the collision detector portion of the interface "listens" to ensure other computers have not begun to transmit.

Q: Our company recently purchased some Digital Equipment Corporation (DEC) personal computers from the Rainbow and Professional series. Could you tell me where we can find software for either computer? We need both business applications and games.

A: According to DEC, you have several sources available: retailers, distributors, and DEC itself. The Computerland and Entre' store chains carry DEC computers and software—you can check with them for the latest software offerings. DEC has a distributor who can also help, Hamilton Micro Systems, which has sales offices around the country.

Two software distributors are developing catalogs of DEC Rainbow-compatible software: Software Distributors, 10023 W. Jefferson Blvd., Culver City, CA 90230, (800) 421-0814 (in California call (800) 252-4025); and Westico at 25 Van Zant St., Norwalk, CT 06855, (203) 853-6880. DEC is testing, adapting, and developing packages for both the Rainbow and Professional series, and is working out joint marketing agreements with outside software houses. Those software houses should number about 100 by the time you read this. For current information on DEC-label software, contact Digital Equipment Corporation, 55 Northeastern Blvd., Nashua, NH 03062, (603) 884-6300. For a list of dealers, call 1-800-DIGITAL; call (213) 559-0661 for custom services software. The Professional series should have VisiCalc and TK!Solver available, and we do know of one series of games for the Rainbow: the Infocom text-adventure games,including Zork, Deadline, and Starcross.



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So you can create "Sally's Gothic" or "Tom's Roman" just by downloading and modifying standard characters. Or you can create a custom set from scratch. Either way, you can store up to 256 new characters. And if you don't need a new alphabet, the RAM functions as a 2K data input buffer.

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CIRCLE 23

Future Computing's Isaacson And Juliussen On The Meaning Of Industry Trends To The Consumer

Portia Isaacson and her husband Egil Juliussen have rapidly become fixtures in the world of personal-computer marketing. Read just about any magazine or newspaper article on the future of the computer business and you're likely to see a statistic attributed to Future Computing Inc., their Richardson, Texas-based market research firm.

Since it was formed in 1981, the firm has grown from two people to 50, has outgrown two offices, and is likely to sell $3 million worth of market research this year alone. Their "Market Forums," usually conducted in Dallas, cover topics ranging from IBM PC-Compatibles to Home Computers; the price tags range upward from $1000 each, but the seminars are well-attended, usually by representatives of large firms.

Juliussen has a Ph.D. in electrical engineering, and spent eight years at Texas Instruments involved in projects such as the first home computer and TI's implementation of Logo. He provides the heavy-duty statistical ammunition that Future Computing offers its clients (often in the form of diskettes bearing VisiCalc models, so purchasers can play with the figures themselves).

Isaacson has a Ph.D. as well, in computer science, and has worked for both Xerox and EDS. A more formative experience for her, however, was starting her own computer store in the late 1970s, at the very dawn of personal-computing history. She has watched the industry, collectively and individually, make every mistake possible, and has never been shy about speaking up.

Personal Computing *visited Isaacson and Juliussen in their overcrowded offices north of Dallas. In the midst of hectic preparations for their largest seminar yet (over 200 attendees), they took some time to discuss their views of just where the personal-computer industry is headed, and what that might mean for the consumer in the months to come.*

> *"I don't think we should be too critical of the manufacturers because they do their best."*
> —ISAACSON

Do you think the consumer is being well-served by the personal-computer industry as it stands now?

Juliussen: Yes, but there's always room for improvement. The industry is really so young that general consumers don't know where to find all the products. They're all out there, but some are from small companies that haven't gotten around to getting a distribution channel.

Isaacson: Consumers know where to buy, say, a TI computer, but they do not know where to buy peripherals or software that might be really neat.

Juliussen: But it's improving all the time. Look at how swiftly this all happened; in less than a year, the manufacturers have gone from selling a few thousand units a month to ten times that amount.

Isaacson: This is a very complex technology, and in the introduction of any kind of major technology to the consumer market there are going to be a lot more mistakes, and some really poor products are introduced. There needs to be a lot more feedback from the marketplace, so I don't think we should be too critical of the manufacturers because they do their best.

The consumer is probably most baffled by the lack of standards in the industry. At this point in the technology, is there some advantage to having a lack of standards?

Isaacson: Only for the manufacturers. We are very strong about standards, but we don't stand up and talk about standards for the good of mankind, because that's not what is going to make the manufacturers adhere to standards. What is really going to make standardization happen is the amount of market dollars.

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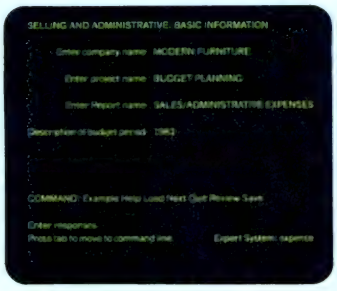

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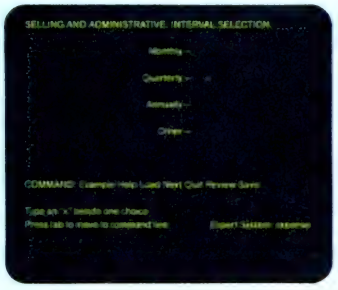
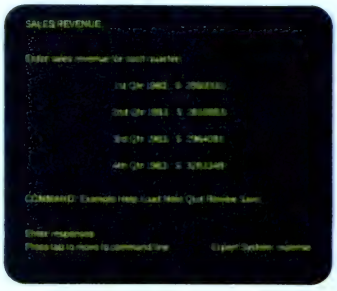


Select budget intervals.

Time: 0.5



Enter sales revenue.

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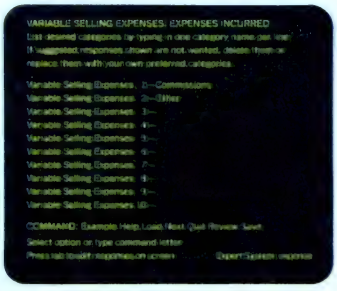

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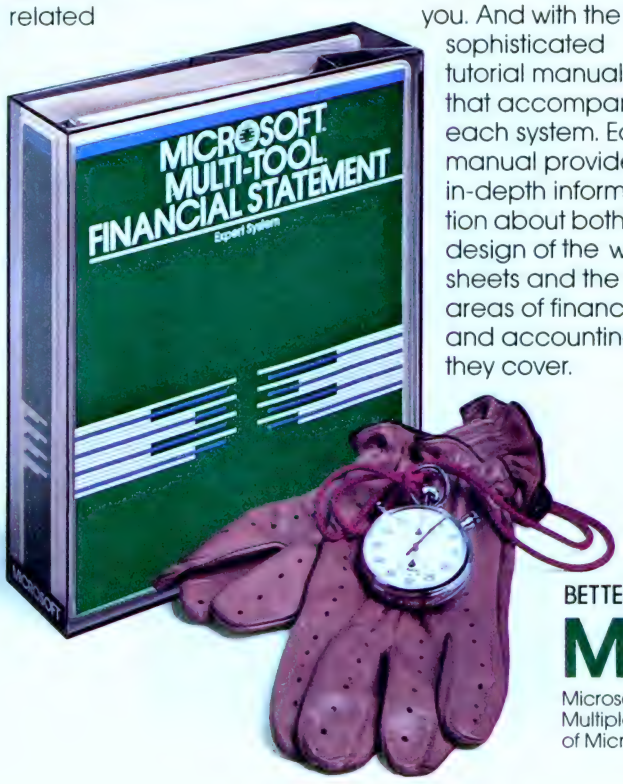

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Nevertheless, there doesn't seem to be any great move in the direction of industry standardization.

Isaacson: I disagree. Let's start where there are standards. We now have a 5¼-inch floppy disk standard. Probably the single most immediate standard cost of the IBM Personal Computer was the physical media standard of the 5¼-inch floppy.

Juliussen: There's no question that we are heading toward standards in the home market. It's not apparent yet because the major manufacturers have been very protective. If manufacturers in that market started making compatible machines—say the consumer could get a 99/4 from someone other than TI—that would really increase the pressure for standardization. It would force that product toward a standard.

Wherever this happens first, that machine is going to be one standard, and clearly the other is the IBM Personal Computer architecture. There are certain to be some home computers based on that architecture this year, whether they are from IBM or not. So that, by itself, will take care of one of the standards—and it doesn't necessarily have to be one. I think there will probably be two, and maybe even three, standards in the home market.

The standards are here. They are percolating below the surface of the industry, and I would say six months from now, certainly within a year, I think you'll see a move toward standards.

Is there any way for the consumer to ensure that he's getting the machine he thinks he's getting?

Isaacson: If somebody says to me, "What computer should I buy?" I say, "Well, without spending a lot of time on your particular needs, let me run through what I see as the major options. If you are looking for something just to get into computing, learn a little bit about it, and you are not going to do anything for work, the TI 99/4 is the lead product. It's a safe recommendation. If you want to step up a bit, learn a little more about computers, have something to use for your work, but you still want a fantastic entertainment machine that you can get a large variety of entertainment and educational software for, then the Apple IIe is the best choice. If you want a machine that's a long-term investment, something you're going to use heavily in work, and you'll probably have the same machine available at work, it has to be IBM Personal Computer-compatible. Now, I did not say IBM—I said compatible. Your needs would have to be awfully unique not to be served by one of those three machines as the leading machine in its category."

> *"There's no question that we are heading toward standards in the home market."*
> —JULIUSSEN

How can the consumer find all that out when he is on the outside?

Isaacson: That's a good question. A good clue for the average consumer would be the number of software packages present in the retail channel. Look at the software. If there's a host of software packages on display in a retail store that you can buy right away for a machine, it shows there's a lot of activity around that machine—that's the machine you should buy. If you look at a machine that has three software packages on display, but the salesman says there's more coming later, walk right on by. That will never be a safe choice.

For example, just this year, on that one criterion alone, you would have picked the TI 99/4 over the VIC, even though the VIC by many measures would have been an equal choice. Now it's a safe choice. But it wasn't six months ago.

How would you advise a prospective buyer to find a dealer?

Isaacson: Referrals. Check their references. You are talking about doing business with somebody. The consumer should take the same approach to this decision as they do to any other serious decision.

If you are going to spend $3000, which is what a lot of people do, it's worth a little of your time. Hang around the store. Go to a user-group club. See if you can find someone who bought a computer from that particular store. If you can't find anyone, then go somewhere else.

You could also start by trying to find people who own certain types of machines and find out where they bought them, and whether or not they are happy with their support. Ask your CPA. He might know someone who bought a computer and where they bought it. CPAs are one of the best sources for such information.

What does the personal computer hardware market look like now, and how do you expect it to change over the next few years?

Juliussen: Let's start with the low end. There are three distinct classes of computers coming into the home market today. The first is bought more on impulse, and the primary motivation here is computer literacy. People say, "Oh, it will only cost me $79." The Timex machine was the only one in this group last year, and the TI 99/2 is the new one this year. The clearest trend in this category is increased memory strength. Last year it had 2k, this year it has 4k, next year it's going to have 8k.

This low-end product is going to merge with what I call the "$300 entertainment product"—where the TI 99/4, the VIC 20, the Color Computer, and the Atari 400 sit today. When these two classes merge a few years

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CIRCLE 7

from now, they will become a $100 color computer.

The entertainment or game machine is definitely going to stay, but its capabilities are going to increase drastically. Today it has 16k, and I can see that jumping to 64k very quickly. I also think you are going to see a modem built into that kind of machine for future information distribution with services such as The Source. The banking-by-phone type services will also be part of this type of machine over the next two years.

The upper level, the $1000 machine, is a floppy-disk-based machine with more capabilities. The price of that machine will drop drastically and will come in well below $1000. It will include a fairly simple printer, a modem, and some kind of mass storage that's better than a cassette. With this machine, you'll be able to do the traditional things you've always done at a higher level—word processing, spreadsheets, data-base management—and it's going to be tailored more toward the consumer.

In general, the manufacturers in the home market today have the inside track on staying major manufacturers, no question about it. The new ones, such as IBM, will clearly make the cut. Apple certainly could make it if they are going to do it. From my point of view, they still have a tremendous opportunity—an Apple II with a ROM cartridge would be a super product—but they have to do it within the next year.

After those companies, the number of new companies that could get in is doubtful. I wouldn't bet on any of them.

What about the software market?

Juliussen: In the software area you are going to see more integrated software—combinations of spreadsheets and graphics. Graphics, by the way, are becoming more important, and they are in color.

How about marketing and distribution? What's going to happen there?

Juliussen: What we are going to see in the marketing and distribution area at the low end in home computers is very aggressive advertising on TV. I would say that probably in the fourth quarter of this year, we'll see software being advertised on network TV. By that time, the installed base of home computers will be so large that it will be economically viable to do that.

Can computer stores do business in the home market?

Juliussen: No, they really cannot. Certainly, if you sell home computers, you should sell them at list price and not get down there with K-Mart and everybody else—that's a sure way to lose money. So you have to be cautious selling home computers if you're not a computer specialist.

There are ways of doing it. For instance, the mass merchandisers are not that strong in selling peripherals, so there is a crying need for peripherals for home computers. If you specialize in carrying peripherals and have a fairly forward lineup of them, then you'll probably do well. The risk you run is that if the mass merchandiser starts picking up that market, you're in trouble.

What important trends are emerging in the personal-computing marketplace?

Isaacson: One important trend is the "windowing" type of software. It's something all the software companies are concerned about. You know, whether or not software does windows. Another thing in software is the new attachments, like the mouse.

There is a trend toward local networks, which are pretty big news this year. In fact, right now, we are evaluating four different major local networks that operate on personal computers. They are becoming really useful. It's very nice to be able to share data between one machine and another.

Do you think Ethernet is going to be a substantial influence as far as local area networks are concerned?

Isaacson: There are three major local networks today, and I do not regard Ethernet as more important than the other two. The three major ones are Omninet, which was originated by Corvus and licensed by several other major manufacturers including NCR and Fujitsu; Arcnet, which was originated by Datapoint, licensed by Tandy, and the basis of the Nestar network which is the IBM Personal Computer-based network; and the third one is Ethernet, and the primary company driving that is 3Com. Right now, the whole world will just wait and see what IBM does, and then there will probably be two important local networks.

Is the LISA-type technology a sub-

"Probably in the fourth quarter of this year, we'll see software advertised on network TV."
—JULIUSSEN

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stantial contribution to computer technology, or is it a fad?

Isaacson: No, it is not a fad. It is a substantial improvement in the user interface and will be exceedingly important. It's what the user wants in terms of being able to use different applications programs together.

One other trend is the true portables market. What's happening there?

Isaacson: The only new thing this year in the portables market is what I'll call the "full-function book-size" that has a great amount of mass storage, like the Gavilan product.

Computers of the Osborne and Compaq variety are very important. They are important because, first of all, they are full-featured personal computers. The fact that they are portable is a fairly minor feature. To me that's not this year, that's last year or the year before. The Gavilan type of product, which is book-size with an LCD display, is a new product class where you have a book-size computer that is equal to a desktop computer in power.

What's happening with the Japanese in the U.S. market?

Isaacson: They aren't selling products yet. So far, the only entry that looks really serious is Epson. They seem to be coming on pretty strong. All of the other companies exhibit at shows and they run ads, but they don't sell any products.

Do you expect that to change?

Isaacson: Not this year. Their products aren't right. Their distribution channels are wrong. I think it will probably be 1985 before they have any significant business in the U.S. Their next wave of product will be a lot better, because the IBM Personal Computer standard has made it clear to the Japanese what they should build. Product cycles are a year or two long, and in Japan they are typically longer than they are in the U.S. So, 1985 would probably be the soonest they would make any significant penetration in the U.S. market.

Juliussen: They have let several opportunities go by. Overall I would say they didn't understand the opportunity they had. They came here and said, "We don't have the software and we don't have distribution channels, so we are not going to be very successful." But, early in the game there was plenty of room to come in. They just missed that opportunity.

Certainly the Japanese companies could do it, but they are going to have to come in with a machine that is compatible with something already on the market. A TI 99/4-compatible machine would be a pretty good strategy for them, or a home computer compatible with the IBM one, whenever they come out with it.

> *"I wouldn't wait to start getting acquainted with this technology and how it can be used."*
> —ISAACSON

In your theory of the dual motivation buyer, you say that when a person looks for a personal computer he has more than one reason for buying it. Which manufacturers have been successful in dealing with this theory?

Juliussen: Apple did, and that's the secret to their success. IBM also catered to that dual motivation and it was, again, very important to make their Personal Computer an important product. People who have not understood this have done poorly. The Xerox 820, to me, is the perfect example of that.

As home computers become more functional, will your theory change?

Juliussen: It really doesn't change it. In the home, entertainment/education is the reason they buy it far more than anything else. But there are going to be some home computers that really have only the entertainment motivation. The low-end spreadsheet/home management-type programs are going to become the other portion of the motivation, and after a while the smart consumer is going to buy the computer that has both.

If you go up to the higher end, it's the other way around. They bought the computer that can do the spreadsheet first, but at the same time had the entertainment/education value. So the order of the dual motivation has been reversed but it is still very strong in both cases.

A certain number of our readers have not bought computers yet. They are still among the curious. One thing people wonder about is whether or not they should wait?

Isaacson: Frankly, I would not wait. It is true that this technology will keep changing in the next 10 years, prices will decrease, and what you can get for the same amount of money will greatly increase. But it's like waiting to get a car and driving a mule. I would not have waited to get a car if I could have possibly afforded it because it is the kind of tool that would give me great freedom, and the computer is also that type of tool. Anybody can find some level of computer they can afford. I wouldn't wait to start getting acquainted with this technology and how it can be used.

You, and other industry watchers, get quoted fairly regularly. What kind of effect do you think you have on the industry?

Juliussen: We know we have an effect and we have chosen to use it carefully. You can use it for good or bad and we think we use it for good.

We have a vision of what's happening, of what's going to happen in the future, and we let everybody use it as a common reference point in the industry. We think we have helped the industry march forward. A lot of companies tend to use us as we should be used—as a sounding board and to find out what is going on.

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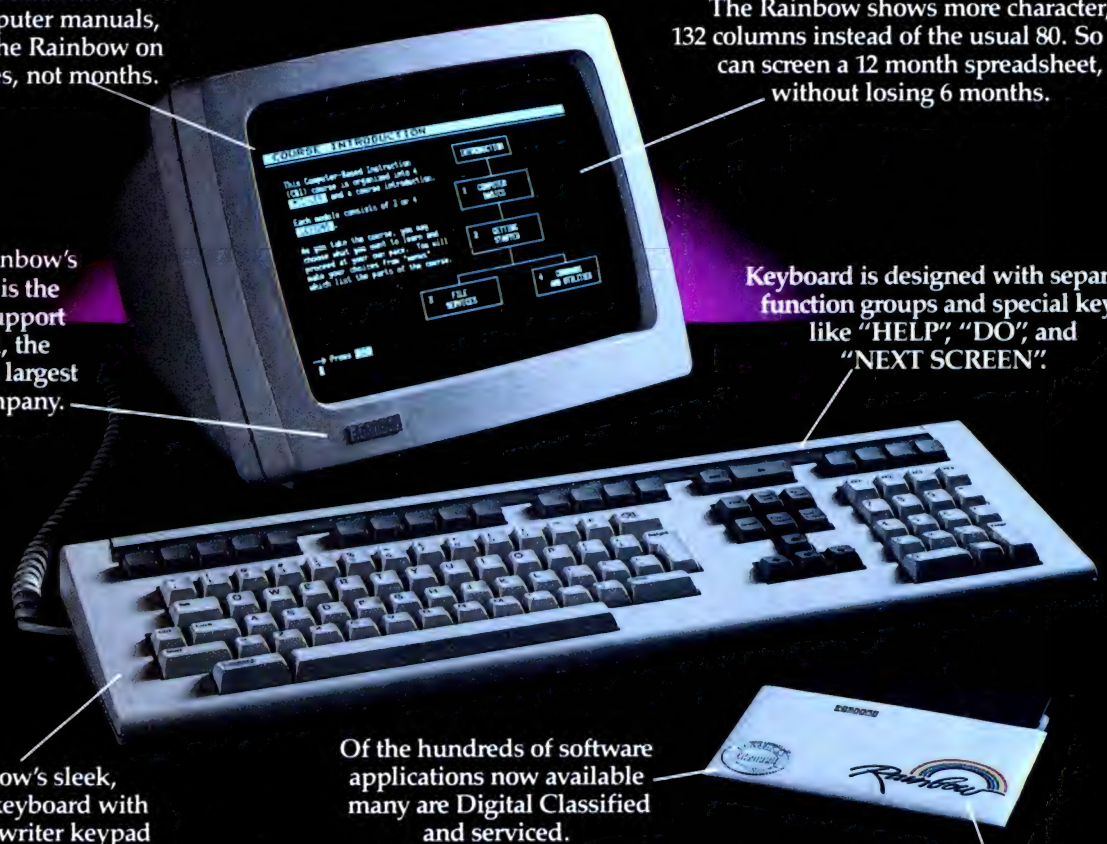

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PERSONAL COMPUTING

Some People *Should* Be Afraid Of Computers

A close look at the computerphobia phenomenon separates the valid reasons from the irrational fears

by Charles Rubin, Associate Editor

Every day we're bombarded with testimonials, news stories, and advertising proclaiming the virtues of personal computers. They'll save you money. They'll save you time. They'll do just about anything you want done a whole lot more efficiently than the way you're doing it now . . . . Perhaps we're even led to believe that anyone who doesn't have a keen interest in and desire to use a personal computer must be sick.

There's even a name for the disease that afflicts these people: computerphobia. According to the dictionary, computerphobia is an "abnormal or unrealistic anxiety" about computers.

But is it sick not to love computers? As popular as computers have become, there are still millions of people who either don't use them or don't use them happily. The shadow of computerphobia hangs over their heads, like some high-tech Sword of Damocles, and they feel compelled to choose between loving computers and having their sanity questioned. Is there no middle ground?

Of course there is. Our attitudes about computers are far too varied and complex to be thrown into two hoppers labeled Computerphobic and Normal. People have all sorts of reasons for being less than enthusiastic about computers. Rather than starting with the assumption that people who are unenthusiastic are abnormal, looking at some of the basic attitudes people have toward computers may help us to understand why they feel the way they do.

Photo by George B. Fry III

Basically, computers are tools for storage, retrieval, organization, and manipulation of large amounts of information. Thousands of people have watched the birth and development of personal computer use in our society without getting excited about it. They're not motivated to learn about computers because they don't see any personal value in them, or perhaps the time and dollar investment seems unreasonable when balanced against the possible improvement in their lives. At one time there was a fairly large pool of people who went out and bought them just to see what they would do. But today's buyers are benefit-oriented, and they're concerned about time: They're not going to buy a computer and spend hours learning to use it if it won't do anything they need to have done.

Computers won't make toast or vacuum a carpet, and despite the existence of programs for filing recipes, personal financial records, or names and addresses, there are many who feel that a paper or index card system is more than adequate for their current or for-

seeable needs. A self-employed photographer, for example, might not feel justified in spending a couple of thousand dollars and several hours of learning time on a computer that will do the monthly books in half an hour instead of the hour it takes without one. Perhaps the money would be better spent on darkroom or camera equipment.

People like this don't have an irrational fear of computers; they have a rational and well-considered disinterest in them. The whole idea of personal computing is the personal use of computers, and the decision to learn about or buy one is a personal decision. No one should take the plunge because computers are great for somebody else.

Computers probably aren't for everyone. Probably everyone interacts with computers in one way or another—whether it's to access an automated bank teller or set the cooking time on a microprocessor-controlled oven—but it seems unlikely that every person in America, let alone the world, will find it necessary or cost effective to own or use a computer for storing or manipulating large amounts of data. Surely there are undeveloped applications for personal computers which will attract a wider segment of buyers, but it is the industry's responsibility to develop them.

Where does that leave the thousands of people who want to use a personal computer, but are still apprehensive about actually using one? What are the reasons behind their computerphobia, and how can it be overcome?

Getting comfortable

Some managers or small business owners who have decided to learn about computing as a business tool have already bought personal computers, but for some reason, the computers go unused. The would-be users are too busy to sit down at the computer, or they're waiting to read the user's guide first, or they thought they'd take an introductory computer class before actually trying out their own system (but somehow haven't even looked into classes offered in their area). But whatever the reason, the result is the same: They're blocked from carrying out their decision to get comfortable with computers.

No time

The most obvious reason for not finding time to sit down at a computer is simply not having the time. People in this situation haven't considered the time investment that's necessary in order to get comfortable with a computer. If they thought they could figure the thing out on coffee breaks, or between appointments, they made a mistake. Learning to use a computer is more like taking up a musical instrument than learning to operate an electrical device. As with music, there are some basics to learn and then several levels of expertise. Simple compositions (like simple computer applications) are fairly easy to learn, but have a limited appeal. The more complex compositions (or applications) take longer, but are of greater value to the user.

One of the biggest mistakes prospective users make is in thinking they are going to "get a computer," in the same way that they would get a stereo system. They don't realize that what's really involved is learning to use a computer, and that means a lot more than simply plugging in the device. For them, it will be a matter of deciding to either rearrange their priorities and make the necessary time to learn, or do without the computer.

There is, however, another side to the question of time: thinking you need more time than you actually do. Computers are fairly complex devices, and many new users seem overwhelmed by them. A glance at any computer magazine reveals hundreds of different computers and peripherals, hundreds of software packages, and several different operating systems and processors. It can all be very confusing. Many prospective computer users mistakenly feel that they must learn everything about computers in order to use one, and they think they don't have enough time to learn because they assume it will take weeks or months of total concentration. Or maybe they'll rush off and take a programming class at a local college and be totally turned off without ever realizing that programming skills aren't necessary for successful computing.

The truth is, you don't need to know very much about computers to use them productively. Personal computers in particular are designed with the needs of the user in mind, and computer manufacturers are well aware that most users want to be able to sit down and learn how to use one or two specific applications as quickly as possible. Most users never learn or need to learn how to program a computer, all they need is a basic understanding of system components like the processing unit, disk drives, software, display, and printer. These basics can be learned in a few minutes.

Who's in charge here?

Whether the environment is a business or a home, some novices are reluctant to approach the computer because they're afraid it will take over their lives by demanding all their time, forcing their dependence, or making personal information available to the whole world. Some portrayals of computer users lend support to these fears. We see users depicted as fanatics who grow round-shouldered from hunching over their computers for hours or days on end. Science fiction warns of computer-controlled societies where free will is absent and the few humans in control have the most intimate data about everyone. And our own experiences

You don't need to know very much about computers to use them productively.

with delays at banks and airline check-in counters have made us wonder about depending too much on computers that do, after all, "go down" from time to time.

Fears of this type are fueled largely by misconceptions about the role of computers in everyday life. Computers don't have personalities that seduce users into long, uninterrupted sessions or plot the depersonalization of society. As for dependence, we are only as dependent on computers as we allow ourselves to be. When pocket calculators became widely available, fears abounded about a generation of people who would forget how to do simple arithmetic operations because they relied on the calculator to do them. These fears haven't been borne out in a decade of calculator use, and there's nothing to suggest that widespread use of computers will destroy our ability to store and manipulate information in other ways. Finally, the feeling of emotional detachment associated with computers goes completely against the notion of personal computing. While certain types of depersonalization can occur in institutional uses of computers, they're not part of the world of personal computers, since by definition the personal computer is a computer used by and for individuals.

Denying stupidity

Some businessmen can't bring themselves to learn about computers because they're afraid of being shown up in front of their employees. They're respected, competent individuals faced with the embarrassing prospect of knowing less about something than many 13-year-olds. This is understandable, but most managers are in the same situation. Consider this example: At a high-level meeting, the president of the company says he thinks it might be a good idea for every vice president to learn to use a personal computer. When the VPs are asked whether they need training, the answer is silence, sidelong glances, and ultimately a none-too-convincing shaking of heads. Few will admit to not knowing about computers. This problem is compounded when one or two of the VPs actually do have personal computers at home and can point to several months of experience.

It may be understandable to deny a lack of knowledge, but you can become trapped if you convince yourself you don't need to learn. The reality is that no one can know how to use a computer without actually sitting down with it, spending a few hours, reading the manual, making a few mistakes, and doing his own work with the applications software he will need to use.

Fear of losing power

Some people have a vested interest in resisting computer use. One firm had its bookkeeping system set up with VisiCalc on a personal computer, and when they hired a business manager it was with the understanding that he would learn to use the system. After several weeks, the manager hadn't touched the computer (although he insisted that he'd learned the system completely). Finally there was a confrontation, and the manager was given the choice of learning the computer for real or quitting. He quit.

A motivated user isn't likely to have this problem, but as a manager or business owner, it pays to remember that your own interest in computing can't be forced on others merely by sticking a computer in the office and telling them to learn to use it.

One office manager who felt she had been pressured into using a personal computer couldn't seem to keep her machine operating properly. There were constant problems with disk drives, software, and other components. Since she was the major user of that particular computer and it required significantly more repairs than the other computers in the office, her boss began to suspect that her negative attitude might be the root of the problem. Sure enough, close observation of the woman using her computer revealed that she had a more-than-average disregard for the machine's needs. She tried to remove floppy disks while the drive was in operation, she reset the machine while it was carrying out various program functions, and generally subjected it to one abuse after another. It became clear that because the woman felt uneasy about using the computer, she took her frustration out on the computer itself.

Fear of breaking the computer

Most of the action in computers takes place inside the hardware, where you can't see it. Large amounts of data may be at stake, and the power computers have to do various things to that data is prominent in the user's mind.

New or prospective users imagine all sorts of disasters will occur if they push the wrong button. These fears are heightened by the use of colorful terms such as "crash," "bomb," or "core dump" to describe computer malfunctions. It's not difficult to imagine the computer blowing up at the touch of a button. But again, this kind of fear comes largely from lack of experience. Every personal computer has systems that safeguard against keystroke errors. The fear of losing large amounts of data is handled by systems of double-checks that ask (in plain language, usually) if you really want to erase or delete that file. Commands for erasing or deleting entire files usually involve two or three separate operations, so the user would have to push more than one wrong button, and in exactly the right order, to make such a mistake.

Unclear documentation

Personal computers are becoming easier to use all the time, and lately

(continued on page 163)

You're looking at the only word processor that's as easy to use as SuperWriter.™

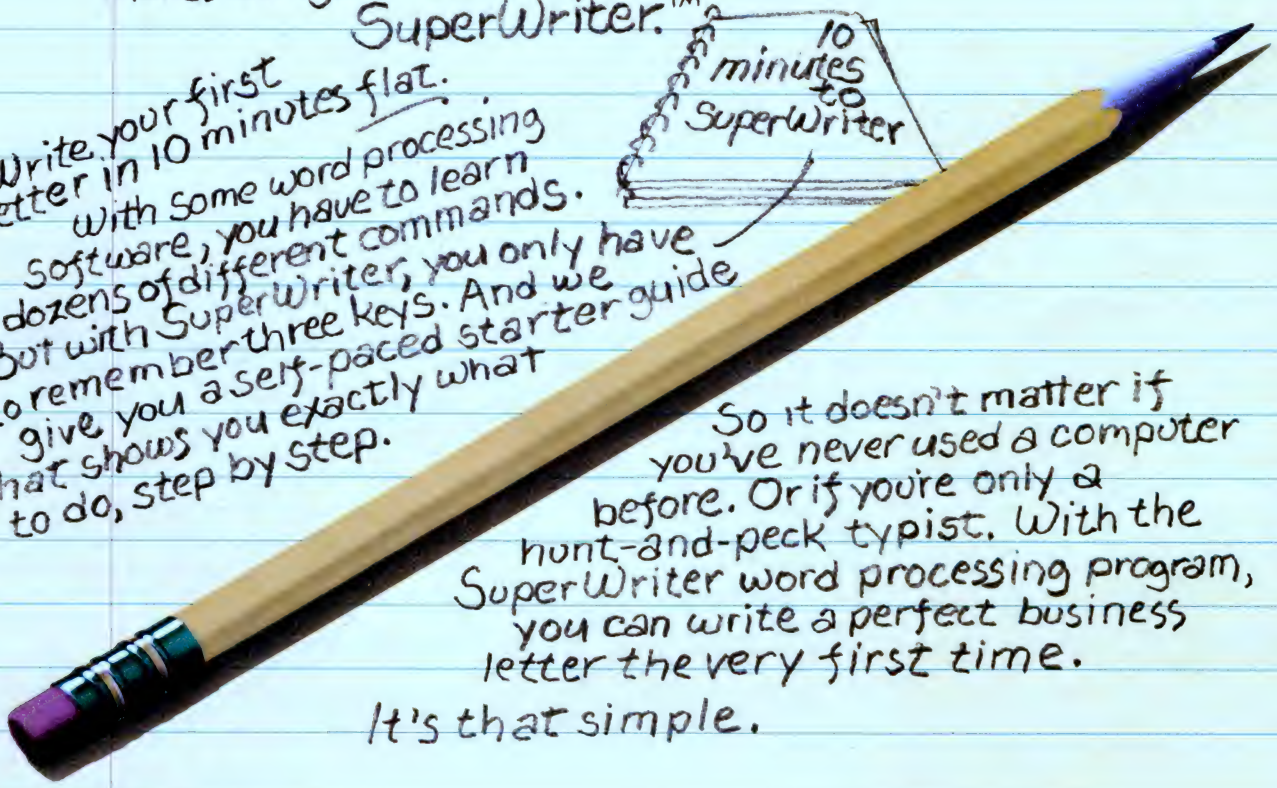
If you're like most people, you don't want to make a career out of word processing. When you have to write a simple letter or memo, all you want to do is roll up your sleeves and get down to business.

And if you're buying a personal computer, now there's a new software package that makes things just that simple.

SuperWriter.™

Write your first letter in 10 minutes flat.

With some word processing software, you have to learn dozens of different commands. But with SuperWriter, you only have to remember three keys. And we give you a self-paced starter guide that shows you exactly what to do, step by step.



So it doesn't matter if you've never used a computer before. Or if you're only a hunt-and-peck typist. With the SuperWriter word processing program, you can write a perfect business letter the very first time.

It's that simple.

Everything you need for only $295.00 - even a spelling cheker.

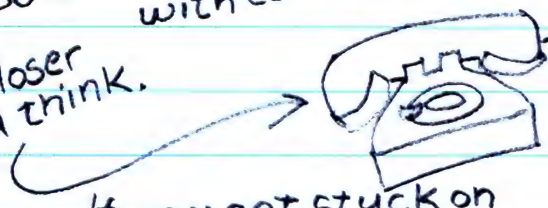
We're talking about a really complete package here. You get a full-function word processor, our 20,000-word SuperSpellGuard™ spelling checker, and a form letter generator. All for $295.00 suggested retail. To get all these functions any other way, you might have to spend $900.00 or more.

You never knew your letters could look so good.

We've built all kinds of professional features into SuperWriter. Like proportional spacing. Boldface highlighting. Memo formatting. And more.

So even if you're a complete beginner, you'll wind up with completely professional results.

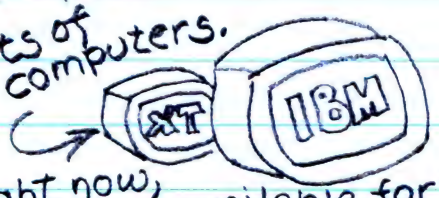
Help is closer than you think.



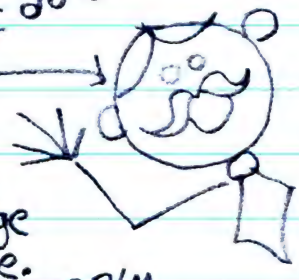
If you get stuck on a problem with any other word processing software, you'll probably have to go back to the store for help.

But if you have any questions at all about SuperWriter, all you do is pick up the phone. We've got a full-time crew of customer service experts on call, ready to help you out.

Works on lots of personal computers.



About the only thing it can't do is doodle.



Right now, SuperWriter is available for the IBM PC and the new IBM PC XT. Of course, it takes full advantage of their features - full color, hard disk and more.

By June 15, we'll have SuperWriter ready for CP/M, CP/M-86 and MS/DOS operating systems, which means you can use it on most of the popular personal computers.

So stop by your nearest computer or software store soon and ask about SuperWriter. In just 10 minutes, you can learn everything you ever need to know about word processing. And see why every other system is too complicated for words.

SuperWriter™
SORCIM®

2310 Lundy Ave.
San Jose, CA 95131
(408) 942-1727

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Body Management

There is a wealth of software on the market that will help you get fit and stay that way

by Karen Freifeld

Don Snow is a typical personal computer user. Co-owner of an oil and gas business in Los Angeles, he purchased an IBM Personal Computer and a spreadsheet program so he could bring work home. Not long after, however, he became involved with another application that is benefiting everyone in his household. He is using a $145 software program called The Nutritionist to improve his family's diet.

It's an important application for the Snows. Don himself has a calcium deficiency problem, so he's using The Nutritionist to monitor his intake of this mineral. He also knows that teenage girls need to be sure to consume enough iron, so he's using the program's "search" capabilities to help identify iron-rich foods for his 13-year-old daughter. Don is also using The Nutritionist to help his wife, who has been taking a lot of vitamin and mineral supplements. "I'm not a health freak," Snow says, "but I do know that it's better to get vitamins and minerals from your foods than by taking vitamin pills. The Nutritionist has a data base of 730 foods for you to look at—just about everything you could think of. You can do a nutritional profile on each one: You'd be surprised at what vitamins and minerals some of these foods have in them."

Snow and his family are by no means unique. Bruce Briscoe of Oakland, Calif., says a program called Health-Aide not only helps him keep track of what he eats, but it also helped him lose 35 pounds. Registered dietician Lillie Grossman uses nutrient data bases to rate such top weight-loss regimens as the Scarsdale, Beverly Hills, and I Love New York diets. Members of the Stratford Club, a fitness club in Connecticut, get their exercise prescriptions with the help of an IBM Personal Computer. And Leonard Jansen, an Olympic-bound racewalker, has improved his performance by turning a spreadsheet into a computerized coaching aid.

They're all part of a growing trend, too. Responding to the fact that more Americans than ever are health and diet conscious, programmers are increasingly developing nutrition and fitness software whose applications appear limitless. A vegetarian, for example, can now be certain of getting enough complete protein. A sedentary person can now plan a personalized exercise regimen based upon his fitness level. A family that wants to stay within its food budget yet still ensure nutritionally balanced meals can now do so with ease. A person with hypertension can now see how lowering sodium intake can affect his blood pressure by plotting it on a screen. Anyone who wants to lose weight and gain fitness can now develop their own diet and exercise regimen. Someone who wants to just keep in shape can track his aerobic exercise progress. Athletes can monitor their training programs. Even people who must stick to a prescribed diet for health reasons now have computer programs geared to their needs.

What value do these programs provide that other, less expensive sources, like books on nutrition, cannot? Here's Don Snow's explanation.

"If you look in a book, it will give you what's in one food, what's in another food, and so on. Then, if you have a long sheet of paper and a lot of time and patience, you can write those values down. You can add up calories and those kinds of things very simply, but you can't see how much iron, say, or potassium you would take in. I guess you could add it up by hand, but I don't want to tackle so much math. Besides, the computer does it so easily. You input a number (the foods in The Nutritionist are coded in a booklet that comes with the program) and the nutritional values are combined to create a nutritional profile of a whole meal—and you never have to do the arithmetic. You can even put in 15 foods that you've had during the day and it will combine them to give you a whole day's nutritional profile."

Karen Freifeld is co-author of The Vegeterian Child, *a guide to healthier eating habits.*

Programmers are developing nutrition and fitness software whose applications appear limitless.

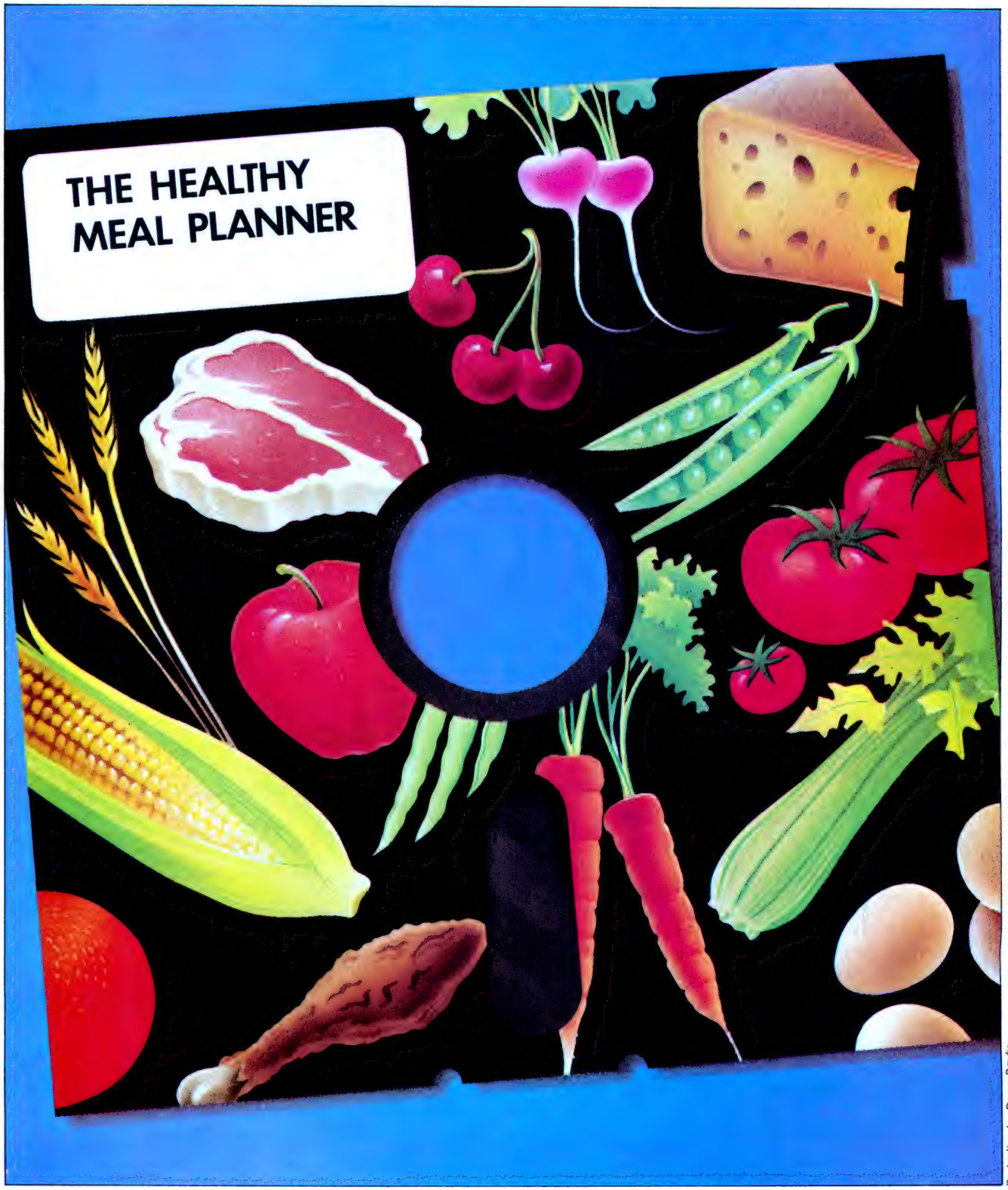


Illustration by Dave Pauly

GUIDELINES FOR CHOOSING DIET AND EXERCISE SOFTWARE

To help determine which diet and/or fitness program is best for you, here are 10 questions you can ask yourself before you buy:

1. Why do you want the program? Do you want it for nutrition analysis alone, just for exercise, or for both? Are plotting and graphics capabilities important to you? What about the ability to keep a monthly or yearly analysis? Do you want special features such as food cost analysis, balancing protein for vegetarians, or a personal data tracker where you can input any values you like? Do you want to be able to store recipes, or do you want a program that already has recipes in its data base? Do you want to generate your own shopping lists? Which of these features will be useful to you?

2. If you're looking at an exercise package, how many activities are you interested in? Some programs deal with a small number, while others contain up to 150 forms of exercise. You might want to know whether you can plot these activities over a long period of time, and whether the program provides an exercise "prescription" or just monitors your activity.

3. How important is absolute accuracy to you? Many experts say the data base must have between 500 and 800 food items stored in memory to be of any real value, but for a data base to be as accurate as possible, at least 4000 to 6000 items would be needed. What and where you eat are also important considerations. Some programs contain mostly or only generic foods, while others use foods by brand names. As Darwin Dennison explains, "If you want to get a valid index of an individual's eating behavior, you can't just say he eats ketchup. You have to put in the kind of ketchup, because different brands may vary in sodium, sugar, and other ingredients." If you or your kids eat in fast food outlets, you might want a program that contains nutritional information on that food, as well.

4. How easy is it to input data? Most programs containing larger data bases use numbered food codes. In other words, you look in a book for the food you've eaten, get its code number, and input that number. This can be time consuming but at the same time, programs which allow you to input foods by name (or an abbreviated version of the name) often don't contain as many items in the data base. So consider ease of use, and balance that against the size of the data base. Remember, though, you must input data daily to get an analysis. If it's a chore, you'll give up—and that, of course, defeats the whole purpose of such a program.

5. Does the program track the nutrients you're interested in? Some programs analyze dozens of nutrients, while others track only a few. More, however, is not always better. "Don't use the number of nutrients as a criterion," warns nutritionist Darlene Dreon of the Stanford Heart Disease Prevention Program. There are programs which claim to analyze 35 or more nutrients, but while the program may be able to analyze a trace element, there may not be any value in a food for that trace element. Also check whether the program analyzes only carbohydrates, fats, proteins, and calories; or whether it also contains at least key vitamins and minerals (if you want to keep track of those).

6. Will the data provided by the program really be meaningful to you? There are essentially two types of nutrition programs available: (1) Professional tools for nutrient analysis, which are geared more toward the nutritionist and may contain too much information and not enough explanation for the lay person; and (2) Educational tools for a "client," or personal computer users. You might ask the company to send you a sample printout to see whether you can understand it. Some programs use common household units whereas others use nutrition jargon (i.e., grams instead of tablespoons). Some graphics displays are easy to interpret, while others provide massive amounts of data and use technical terms that are difficult for the lay person to comprehend. You might also see whether the program provides summarized explanations of the data, or if you have to interpret the data yourself.

7. What about the documentation provided with the program? Just as you want a program you can understand and work with, you want a manual that will clearly explain how to use that program. You may also want to consider buying a general nutrition book, since many of these programs were developed by programmers, not nutritionists or other health professionals.

8. How much flexibility do you want? You may want the ability to edit the data base—to combine foods you have often, to delete those which you never eat to make room for others, or even to use different values than the ones prescribed.

Nutrition/microcomputer consultant Beverly Carne, for example, is impressed with The Nutritionist's editing capabilities. She says: "The RDA values can change every four years when the National Academy of Sciences updates them. You can update them with this program, so that's a nice feature."

9. Has the program been around for a while? Says Darwin Dennison, "I've wasted a lot of money buying software that didn't do what the brochure said it would do, and had a lot of glitches and problems." This is a particular problem for CP/M users, because most of the programs run on the Apple. IBM Personal Computer programs are quickly making their way to market, but again, many of these are new, and they may still have a few bugs. As for CP/M users, several manufacturers claimed to have CP/M versions planned at press time (see buyer's guide), but we were only able to locate two programs that were available—one was only for those with 8-inch drives, while the other cost $4800.

10. Is cost a factor? Programs vary in price, but don't assume that the more costly the program, the better it is. A $39 or $75 program may fit your needs just as well as one which costs $500 or $1000.

The program makes recommendations for improving the user's diet.

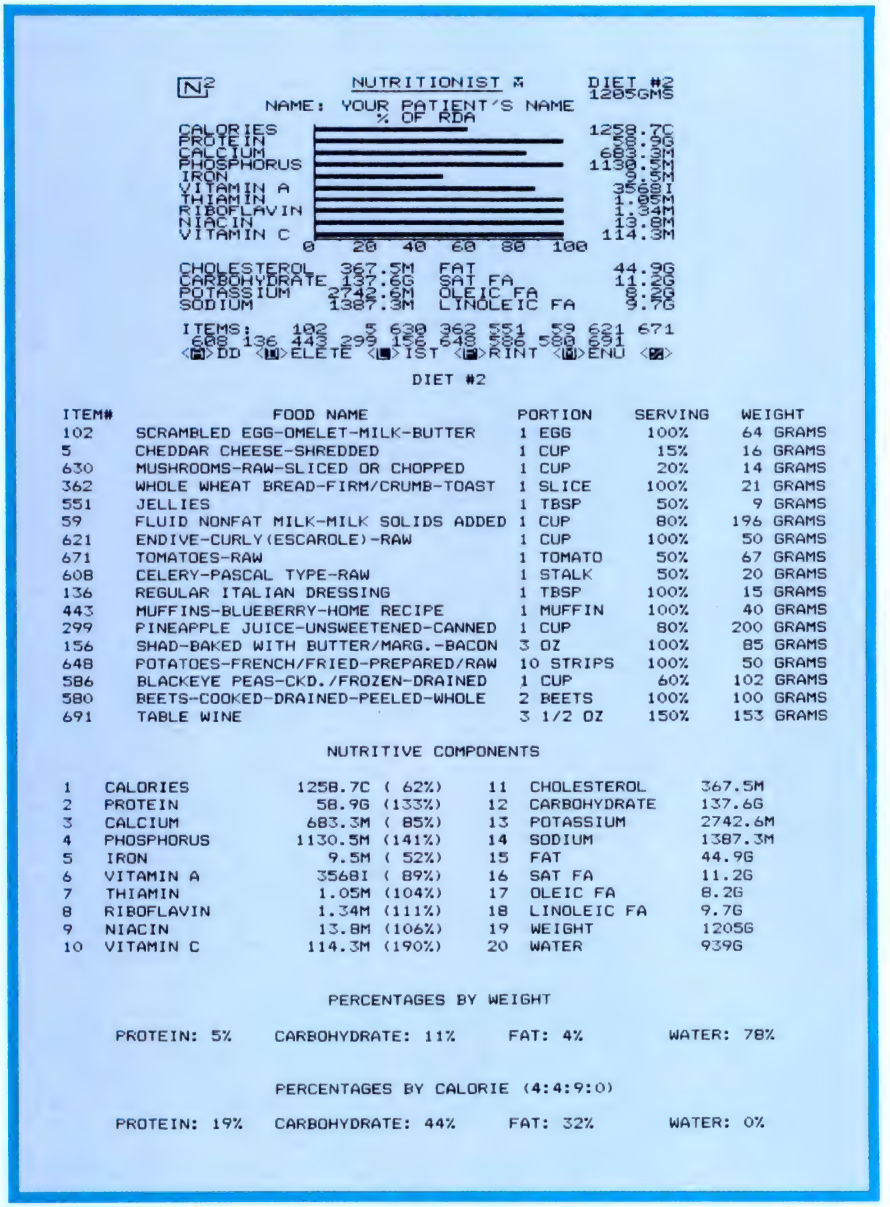
Most of the nutritional analysis programs now available analyze a person's food choices for a certain number of nutrients and total daily calories based upon the Recommended Daily Allowances (RDAs) for weight, age, sex, and other variables. The user needs only to plug in those variables to get started. The program stores that data in its memory. After that, the user just inputs what and how much he has eaten and the program provides the RDA scorecard.

The Nutritionist is only one such program. A simpler program, available from Pillsbury, is a particular hit in schools across the nation. Called Eat Smart, it shows users whether they've met two-thirds of their RDAs for key nutrients—protein, vitamins A and C, thiamin, riboflavin, niacin, calcium, and iron, as well as total calories consumed—and makes recommendations when users miss or exceed their marks. It also shows them how much sodium and cholesterol they've consumed, and what percentage of the day's calories was derived from fat.

The program then makes recommendations for improving the user's diet. For example, after one user plugged in her day's meals, Eat Smart told her, "Your food choices supply more protein than you really need. You could eat smaller portions of protein-rich foods, such as meat, fish, cheese, and eggs. Your food choices supply less than two-thirds of the RDA for calcium. Sources of calcium are milk, cheese, and dark green leafy vegetables (chard, turnip greens, mustard greens, and kale). Choose low-fat dairy products if you are concerned about calories."

Eat Smart does have its drawbacks, however. Its simplified nutritional analysis program contains only 136 foods for the user to choose from, while the average diet is a lot more varied than that. Further confusion can result because different brands of the same food often have different values. (A Thomas' English muffin, for example, contains 215 mg. of sodium, while a Pepperidge Farm muffin contains 633 mg.) Therefore, Eat Smart is more of an educational tool than an assessment of someone's dietary status. Nutritionists and other health professionals who want scientifically accurate data often use data bases containing thousands of food items. This often means plugging into a big computer system. However, there are several fairly sophisticated programs available that are geared to personal computers which will suit home users' needs.

(continued on page 67)
(see buyer's guide next page)



N² NUTRITIONIST ™ DIET #2
1205GMS

NAME: YOUR PATIENT'S NAME

% OF RDA

CALORIES		1258.7C
PROTEIN		58.9G
CALCIUM		683.3M
PHOSPHORUS		1130.5M
IRON		9.5M
VITAMIN A		3568I
THIAMIN		1.05M
RIBOFLAVIN		1.34M
NIACIN		13.8M
VITAMIN C		114.3M

0 20 40 60 80 100

CHOLESTEROL	367.5M	FAT	44.9G
CARBOHYDRATE	137.6G	SAT FA	11.2G
POTASSIUM	2742.6M	OLEIC FA	8.2G
SODIUM	1387.3M	LINOLEIC FA	9.7G

ITEMS: 102 5 630 362 551 59 621 671
608 136 443 299 156 648 586 580 691
<D>DD <D>ELETE <L>IST <P>RINT <E>ND <?>

DIET #2

ITEM#	FOOD NAME	PORTION	SERVING	WEIGHT
102	SCRAMBLED EGG-OMELET-MILK-BUTTER	1 EGG	100%	64 GRAMS
5	CHEDDAR CHEESE-SHREDDED	1 CUP	15%	16 GRAMS
630	MUSHROOMS-RAW-SLICED OR CHOPPED	1 CUP	20%	14 GRAMS
362	WHOLE WHEAT BREAD-FIRM/CRUMB-TOAST	1 SLICE	100%	21 GRAMS
551	JELLIES	1 TBSP	50%	9 GRAMS
59	FLUID NONFAT MILK-MILK SOLIDS ADDED	1 CUP	80%	196 GRAMS
621	ENDIVE-CURLY(ESCAROLE)-RAW	1 CUP	100%	50 GRAMS
671	TOMATOES-RAW	1 TOMATO	50%	67 GRAMS
608	CELERY-PASCAL TYPE-RAW	1 STALK	50%	20 GRAMS
136	REGULAR ITALIAN DRESSING	1 TBSP	100%	15 GRAMS
443	MUFFINS-BLUEBERRY-HOME RECIPE	1 MUFFIN	100%	40 GRAMS
299	PINEAPPLE JUICE-UNSWEETENED-CANNED	1 CUP	80%	200 GRAMS
156	SHAD-BAKED WITH BUTTER/MARG.-BACON	3 OZ	100%	85 GRAMS
648	POTATOES-FRENCH/FRIED-PREPARED/RAW	10 STRIPS	100%	50 GRAMS
586	BLACKEYE PEAS-CKD./FROZEN-DRAINED	1 CUP	60%	102 GRAMS
580	BEETS-COOKED-DRAINED-PEELED-WHOLE	2 BEETS	100%	100 GRAMS
691	TABLE WINE	3 1/2 OZ	150%	153 GRAMS

NUTRITIVE COMPONENTS

1	CALORIES	1258.7C (62%)	11	CHOLESTEROL	367.5M
2	PROTEIN	58.9G (133%)	12	CARBOHYDRATE	137.6G
3	CALCIUM	683.3M (85%)	13	POTASSIUM	2742.6M
4	PHOSPHORUS	1130.5M (141%)	14	SODIUM	1387.3M
5	IRON	9.5M (52%)	15	FAT	44.9G
6	VITAMIN A	3568I (89%)	16	SAT FA	11.2G
7	THIAMIN	1.05M (104%)	17	OLEIC FA	8.2G
8	RIBOFLAVIN	1.34M (111%)	18	LINOLEIC FA	9.7G
9	NIACIN	13.8M (106%)	19	WEIGHT	1205G
10	VITAMIN C	114.3M (190%)	20	WATER	939G

PERCENTAGES BY WEIGHT

PROTEIN: 5% CARBOHYDRATE: 11% FAT: 4% WATER: 78%

PERCENTAGES BY CALORIE (4:4:9:0)

PROTEIN: 19% CARBOHYDRATE: 44% FAT: 32% WATER: 0%

Printout from The Nutritionist computer program demonstrates some of the features of diet-analysis software. This type of detailed analysis of the day's intake of food can be useful for people who need to monitor specific aspects of their diet.

A SAMPLING OF DIET AND FITNESS PROGRAMS

CHUBBY CHECKER
Health and Habitation Inc.
5 Pathfinder Dr.
Sunter, SC 29150
(803) 469-9180
HP-85; versions for the HP-86 and HP-87 expected this summer
$95
This is a food and total-calorie program, not a nutritional analysis. It contains a code-free data base of 330 foods, with portions in household units. It can calculate the number of calories consumed, and show you how much you'll weigh in a year's time if the same caloric level is maintained. It can also track your progress on a daily basis for 365 days.

DIETARY ANALYSIS AND ASSESSMENT (DAS)
Health Management Systems Associates
18 Greenway Gables
Minneapolis, MN 55403
(612) 370-0720
CP/M systems with double-sided, double-density dual disk drives, 16k internal memory, 128k storage on 5¼-inch disks
IBM Personal Computer
$4800
With a code-free expandable data base of 1400 foods, including fast foods, brand names, and ingredients, DAS can analyze a diet for 26 food constituents and seven food groups. It provides "Okay," "Low," "Too Low," and "High" assessments, as well as percentages in comparing the user's diet to RDAs. Designed for health and fitness professionals, but can be easily understood and used by lay persons.

DINE
The DINE System
724 Robin Rd.
West Amherst, NY 14228
Franklin Ace 1000; PET with Apple Emulator, Apple II with 48k, Apple III, Apple IIe; versions for Atari 800 and CP/M available soon
$75
DINE is a sophisticated program, yet simple enough for any user. It contains an expandable, coded data base of 3500 foods, including fast food outlets and brands. The program checks the user's diet for 10 "predictor" nutrients—if you have these, you also have the other 40 nutrients in your diet. A printed message tells you when your caloric intake is too high or too low. It stores up to three days' diets.

EAT SMART
Eat Smart Kit
Consumer Public Relations—3286
The Pillsbury Company
Pillsbury Center
Minneapolis, MN 55402
(612) 330-8732
Apple II with 48k; DOS 3.3
$19.75
This program was designed as an educational tool, and makes general suggestions for improving your diet. It has a coded data base of 136 foods, and analyzes your diet daily, providing analysis for percentage of each user's RDA for about 10 nutrients.

HEALTH-AIDE
Knossos Inc.
422 Redwood Ave.
Corte Madera, CA 94925
(800) 792-0990 x467 or
(800) 227-3800 x467 (outside CA)
Apple II, III; version for IBM Personal Computer to be released by 8/83
$79.95
This program has an expandable data base of over 800 foods for 33 nutrient values, including essential amino acids. Foods are coded by abbreviated versions of food names rather than by number. It offers cost analyses, personal data tracker (for inputting any 10 personal values, such as blood pressure or running times), shopping lists, monthly and yearly graphs and plotting capabilities. The program contains 21 balanced menus for different calorie levels, and gives food exchange levels. Energy expenditures may be calculated through time spent each day on any of 150 activities.

HEALTHPATHS
Healthpaths
68 Olive St.
Chagrin Falls, OH 44022
(216) 247-5298
IBM Personal Computer
$3500
Geared toward health clubs, Healthpaths is a fitness management tool which, aside from basic management applications, evaluates physiological test results on such parameters as flexibility, body composition, muscle strength and endurance, and aerobic fitness. The program then prescribes exercise plans. A home version of the program for the whole family is expected to be available in the fall for under $100.

THE HEALTHY MEAL PLANNER
Abt Associates Inc.
55 Wheeler St.
Cambridge, MA 02138
(617) 492-7100
Apple II with 64k; other versions planned
$500
For diabetics as well as dieticians, this program contains a data base of 600 foods and 125 recipes to be used for meal planning. It contains a diabetic exchange program and makes certain that diabetics plan their meals to conform to a prescribed meal pattern. Users receive immediate feedback if they add food items or servings which are incompatible with their meal plans. Only three keys are needed to operate the program.

INSHAPE
DEG Software
11999 Katy Freeway, Suite 150
Houston, TX 77079
(713) 531-6100
IBM Personal Computer with 80-column monitor; DOS 1.0 and 1.1 with 64k; DOS 2.0 with 96k
$95
A personal diet and exercise program with a non-coded food dictionary of over 1000 foods analyzed for carbohydrate, fat, calorie, and protein content (but not vitamins and minerals). It can calculate point values for 24 aerobic exercises, and has various plotting functions for 60-day and 52-week summaries.

MENU II
C&H Video
110 West Caracas Ave.
Hershey, PA 17033
Apple II Plus, DOS 3.3, 48k, one or two drives
$39.95
This program offers no nutritional information, but it can be useful for storing recipes, developing menus for up to 14 days, and for making shopping lists. It also includes a data base of recipes.

MICRO COOKBOOK
Virtual Combanatics
P.O. Box 755
Rockport, MA 01966
(617) 546-6533
Apple II, IIe; IBM Personal Computer
$30
A cookbook and recipe management system which can retrieve recipes by name, category, or ingredients. It contains 154 recipes, and users can alter them or add new ones as well as print shopping lists. The program also gives a calorie guide, food buying and storage hints, and a glossary of cooking terms. Optional diskettes for soups, salads, and appetizers are available.

Several software packages combine both nutrition and exercise for a total fitness regimen.

NUTRI-CALC
PCD Systems Inc.
P.O. Box 143
Penn Yan, NY 14527
(315) 536-7428
Apple II Plus with 48k; IBM Personal Computer, Displaywriter; TRS-80 Models II, III, 12, and 16; Altos; Digital Equipment 350; TI series; Sage II; CP/M-based machines with eight-inch disk drives and 48k; version for TRS-80 Model 4 to come
$350
With a coded data base of 730 foods (expandable to 1000 on Apple II), nutrients as well as foods in the data base can be analyzed. It can calculate caloric intake necessary to lose or maintain weight within a given period relative to physical activity. Five activities are included—sitting, standing, sleeping, walking, and vigorous activity. It can calculate customized recipes or menus for up to a seven-day period.

NUTRICHEC
Omni Soft
7425 South Maplewood
Tulsa, OK 74138
(918) 496-8409
Apple II, III
$60 (version 2.0)
Features a code-free, expandable data base of 748 foods (with room for 300 more). Enter your age, weight, sex, etc., and Nutrichec tells you how you compare to RDA. It can analyze about 15 nutrients, excluding carbohydrate intake. A two-disk version (Nutrichec 2.1) program should be available this summer, and will run faster and contain over 1000 foods. It also has storage capability, which the version 2.0 does not. This new version will sell for about $90. Advanced Nutrichec is a third version in the works, and will include a 600-food data base and the ability to analyze 21 nutrients, including vitamins B6, B12, zinc, folacin, and saturated fat. This version will sell for about $100.

NUTRILIZER
Comcater International Inc.
65 S. Main St.
Pennington, NJ 08534
(609) 737-1540
Apple II Plus with 48k, two drives; version for IBM Personal Computer is planned
$500
This program is geared toward the user who wants to build his own food, recipe, and menu data base. It has a data base of 200 foods (which can be referred to by code or name), and can be expanded to 500 foods and recipes. Up to 26 nutrients can be analyzed. Menu analysis, nutrient summary, and food item analysis as well as recipe sizing and scaling are possible. Tables and graphs can be drawn to show comparisons between user's menu and nutrient standards.

NUTRI-MAN
Quant-m Corp.
P.O. Box 55
Newfane, NY 14108
TRS-80 Models I, II
$250
Nutri-Man allows the user to budget and analyze daily diet and vitamin supplementation; keep household food inventory, shopping lists, and menu plans.

THE NUTRITIONIST
N-Squared Computing
5318 Forest Ridge Rd.
Silverton, OR 97381
(503) 873-5906
Apple II Plus with 48k, DOS 3.3, one drive; IBM Personal Computer, 64k, one drive; CP/M-based version planned
$145
With an expandable, coded data base of 730 foods analyzed for 19 nutrients, this program allows the user to analyze and create special diets. A "sort" function identifies foods with certain nutrients. The menu-driven program is highly modifiable, providing updating and editing capabilities. A Nutritionist II program, with a larger data base and expanded capabilities, is planned.

PERSONAL WEIGHT CONTROL PROGRAM
International Publishing and Software Inc.
3952 Chesswood Dr.
Downsview, Ontario
Canada M3J 2W6
(416) 636-9409
Timex Sinclair 1000, ZX81
$29.95
This program analyzes your present diet to assist in establishing weight loss goals. The user enters the number of servings he wants from eight different food groups, and the program provides daily caloric intake to aim for, based on ideal weight for height and sex.

THE SHORT REPORT—MICRO
Nutrition Services
Division of Health Development Inc.
1165 West Third Ave.
P.O. Box 12299
Columbus, OH 43212
(614) 294-2688
Apple II Plus with 48k, Apple III; IBM Personal Computer with two drives
$995 (lease agreements possible)
Geared for the professional (but easy for the non-professional to understand, too), it contains a coded data base (expandable on the IBM version only) of basic, brand name, and fast foods. The user types in 20-character descriptions of food items, except for 400 foods which automatically trigger a description. It has editing capabilities for RDA values, high and low ranges, summary notes, and a data base. Energy analysis is divided into four categories for sleeping, light, moderate, and heavy activity. Graphics capabilities.

SNACKMASTER
The Learning Seed Company
21250 North Andover Rd.
Kildeer, IL 60047
(312) 438-3251
Apple II
$34
This is an educational game. Ten snack temptations are presented to the user, and he must decide which combination has the lowest calorie count. Any total under 1400 calories wins. It has a randomly accessed snack selection, so the game can be played repeatedly without using the same snacks. The company is also planning to release another program called Fast-Food Micro-Guide, which will provide a menu of 10 major fast-food franchises. Users select their order, and are then provided with a feedout of nutritional values. A Label Analysis program is also planned, which will provide detailed analyses of additives found in packaged foods.

WHAT'S IN YOUR LUNCH?
Lawrence Hall of Science
Math/Computer Education Project
University of California
Berkeley, CA 94720
Apple II; Commodore PET (8k) with 16k cassette; Atari (16k) with 32k cassette and disk
$20
An educational program geared toward children, it provides nutrient analysis and "what if" questions using a data base of 117 food items.

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PLATO
COMPUTER-BASED EDUCATION
CIRCLE 24

CONTROL DATA PUBLISHING

You can keep track of how you're doing with your exercises, and compare those exercises to calories consumed.

(continued from page 63)

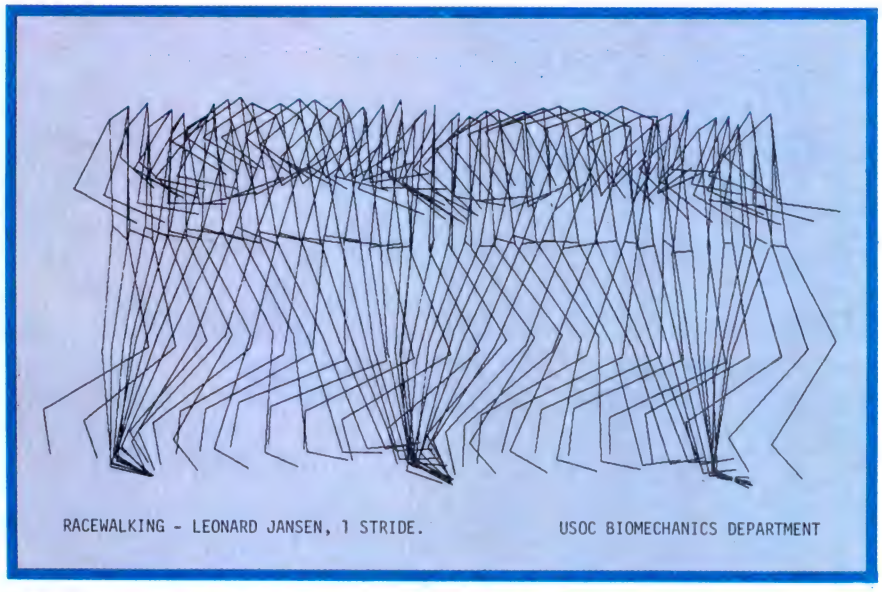
The DINE program is one example. Developed by Darwin Dennison, a health education professor at the State University of New York at Buffalo, the $75 DINE system stuffs a data base of 3500 brand name and basic foods, including offerings from 11 fast-food chains, into the Apple II's 48k, and analyzes them for nutritional value.

Demystifying nutrition

DINE is used by many health professionals, Dennison says, but it is also easy for the lay person to use and understand. "You can look at your diet input and it will tell you how nutritiously you're eating, on a one to 10 basis. Ten is excellent. If you eat all 10 nutrients analyzed in the program in the proper amounts and quantities, you get a 10. If you're not eating enough protein or too much saturated fat or cholesterol, and not enough vitamin C, then you would get a lower score—say a one or two." In other words, the DINE program is "designed to reduce the mysticism of nutrition" for the home user.

And that, says Catherine Hanley, who helped develop Eat Smart and saw its popularity soar, is why nutrition programs are becoming popular so fast. "What has happened is that the computer—that technological marvel—has become the instrument which helps take the mystery and confusion out of nutrition because it is used where it really matters—on the basis of food as it is eaten."

People who are concerned about their overall health and fitness might consider a program with a wider scope. Diet, after all, is only one aspect of staying in shape—exercise is the other, of course. Several software packages combine both for a total fitness regimen. If you're more interested in monitoring your exercise than your diet, for example, you may want to consider a program such as InShape, which runs on the IBM Personal Computer. As InShape's co-



Digitized image of athlete Leonard Jansen, made from high-speed film projected onto a digitizing tablet, helped him analyze his racewalking performance.

author, Carl Strange, says: "We looked around and all we found were programs that had incredible details about the 32 vitamins and trace minerals that I don't really care about. And we're assuming the majority of the public doesn't really care how much thiamin is in an apple." InShape, therefore, contains a food dictionary of over 1000 foods and analyzes them for protein, carbohydrates, fat, and calories, but not for vitamins and minerals. "We got rid of some of (what we consider) the boring nutritional information to make room for something else," explains Strange. "And the something else we decided on is an aerobics exercise package."

The exercise part of the program helps evaluate 24 forms of exercise, including jogging, swimming, bicycling, tennis, racquetball, karate, and aerobic dancing. And then, by utilizing equations developed by Kenneth Cooper, the founder of the Aerobics Center in Dallas, Texas, the user can be sure he is keeping fit.

"Cooper's whole program is to earn a certain number of aerobic points within a week—it doesn't matter how you do it, or what exercise you do. If you earn this many points, you're going to be in very good shape," says Strange. "Cooper uses these points to quantify exercises—so that you can compare a 3000-yard swim with a two-mile run, for instance. We've taken the equations he uses to allot point values to an exercise and put them into the program. So you tell InShape what exercise you did today. InShape then computes a point value for that and displays it on the screen. You can do up to eight different exercises a day, and as you accumulate these exercise points, the program keeps a daily total, including how many minutes you exercised as well as all the rest of the details."

Once you've told InShape about your daily food intake and exercise expenditure, you can use the data in a variety of ways. You can ask the program to show you the number of calories you consumed that day. Or you can keep track of how you're doing with your exercises, and even compare those exercises to calories consumed. "We can plot an incredible number of things on the

PRESENTING THE REMARKABLE SV-318.

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THE PERSONAL COMPUTER YOU'LL GROW INTO, NOT OUT OF.

SPECTRAVIDEO SV-318 COMPUTER COMPARISON CHART

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BASE PRICE	$299	$1,540	$899	$595	$399	$299
COMPUTING POWER FEATURES						
BUILT-IN ROM	32K	12K	10K	20K	16K	8K
EXPANDABLE TO	96K	N/A	42K	N/A	32K	16K
BUILT-IN EXTENDED MICROSOFT* BASIC	YES	YES	ADDITIONAL COST	NO	YES	ADDITIONAL COST
BUILT-IN RAM	32K*	48K	16K	64K	16K	4K
EXPANDABLE TO	144K**	64K	48K	N/A	32K	16K
KEYBOARD FEATURES						
NUMBER OF KEYS	71	51	61	66	71	55
USER DEFINE FUNCTIONS	10	N/A	4	8	10	NONE
SPECIAL WORD PROCESSING	YES	NO	NO	NO	NO	NO
GENERATED GRAPHICS (FROM KEYBOARD)	YES	NO	YES	YES	NO	NO
UPPER/LOWER CASE	YES	UPPER ONLY	YES	YES	YES	YES
GAME/AUDIO FEATURES						
SEPARATE CARTRIDGE SLOTS	YES	NO	YES	NO	NO	NO
BUILT-IN JOYSTICK	YES	NO	NO	NO	NO	NO
COLORS	16	15	128	16	9	9
RESOLUTION (PIXELS)	256 x 192	280 x 160	320 x 192	320 x 200	256 x 192	128 x 64
SPRITES	32	N/A	4	8	N/A	N/A
SOUND CHANNELS	3	1	4	3	3	1
OCTAVES PER CHANNEL	8	4	4	9	8	10
A.D.S.R. ENVELOPE	YES	NO	NO	YES	YES	NO
PERIPHERAL SPECIFICATIONS						
CASSETTE	2 CHANNEL	1 CHANNEL	2 CHANNEL	1 CHANNEL	1 CHANNEL	1 CHANNEL
AUDIO IO	YES	NO	YES	NO	NO	NO
BUILT-IN MIC	YES	NO	NO	NO	NO	NO
DISK DRIVE CAPACITY	256K	143K	96K	170K	N/A	170K
(LOW PROFILE)	YES	NO	NO	NO	NO	NO
CP/M* COMPATIBILITY (80 column programs)						
CP/M* 2.2	YES	NO***	NO	NO****	NO	NO
CP/M* 3.0	YES	NO	NO	NO	NO	NO

* 16K user addressable plus 16K graphic support
** 128K user addressable plus 16K graphic support
*** Apple II can accept modified 40 or 80 column CP/M
**** Commodore 64 accepts 40 column CP/M

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CIRCLE 21

The program provided Briscoe with the incentive he needed to continue his diet.

screen," says Strange. "Our plots show either 60 days or 52 weeks. From that, you can say 'How many points did I get running this year? How many points did I earn swimming?' Or, for people who have one primary exercise that they use, like running, they could plot that exercise versus weight loss or even total calories consumed versus weight loss."

To whom would such a program appeal? Explains Strange: "We wanted something to go into the average exercise-nut's home, just to give them a tool for monitoring their diet and exercise. The people who are going to sit down and use it every day are the people who are serious enough about running to get a good pair of track shoes. They are our targets."

Bruce Briscoe is not one of these people, however, because he hates exercise. But he is interested in keeping his weight down. About a year ago, Briscoe was wandering around the Applefest computer show in San Francisco when he came upon the Health-Aide program. "That's better than any of the games I've seen," he thought, and decided to lay out the $80 for the program.

It was money well spent, he says. "I picked it up to monitor my nutrition and to help me with my diet. And it really did." Briscoe input his current weight and his ideal weight, and then decided how quickly he wanted to meet his goal. Health-Aide did the rest. It figured out how many calories he could take in every day to meet the goal. If he overate one day, the program would combine nutrition with Briscoe's dreaded exercise—it would tell him how many miles he needed to run or what other exercise he needed to do that day to burn up the extra calories (options Briscoe chose to ignore). And, if he underate, the program would tell him that, too.

As Health-Aide's developer Bob Etheredge explains, "You can put in an angel food cake and see how much you have to run to burn it off. Based on your body weight as well as other factors, it does all the mathematical things for you."

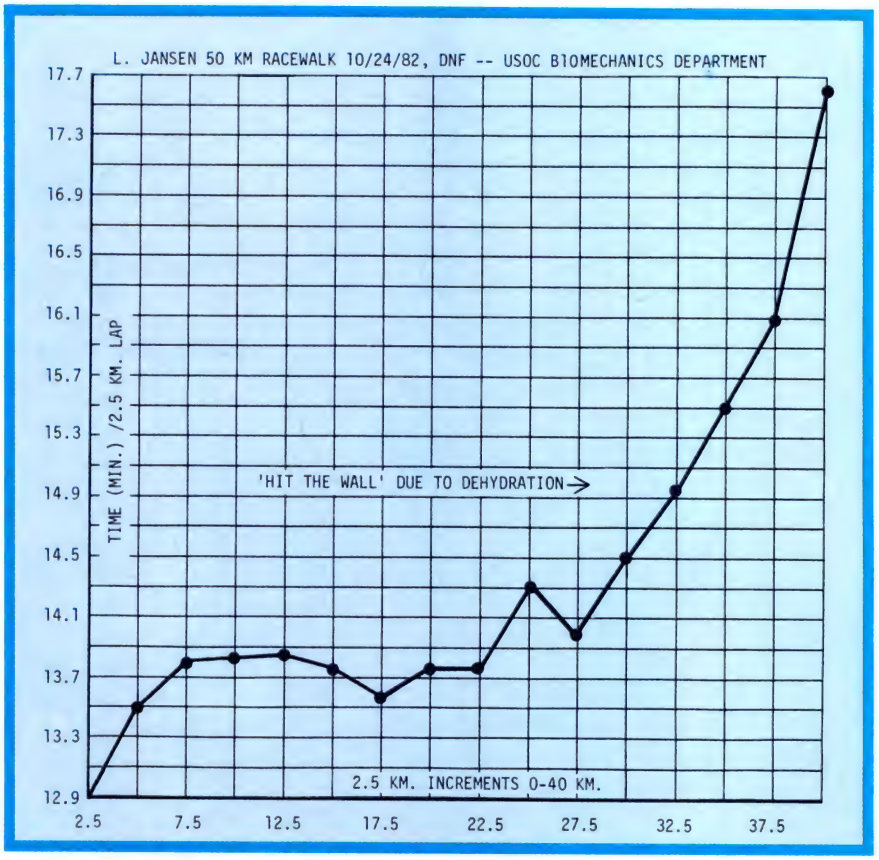
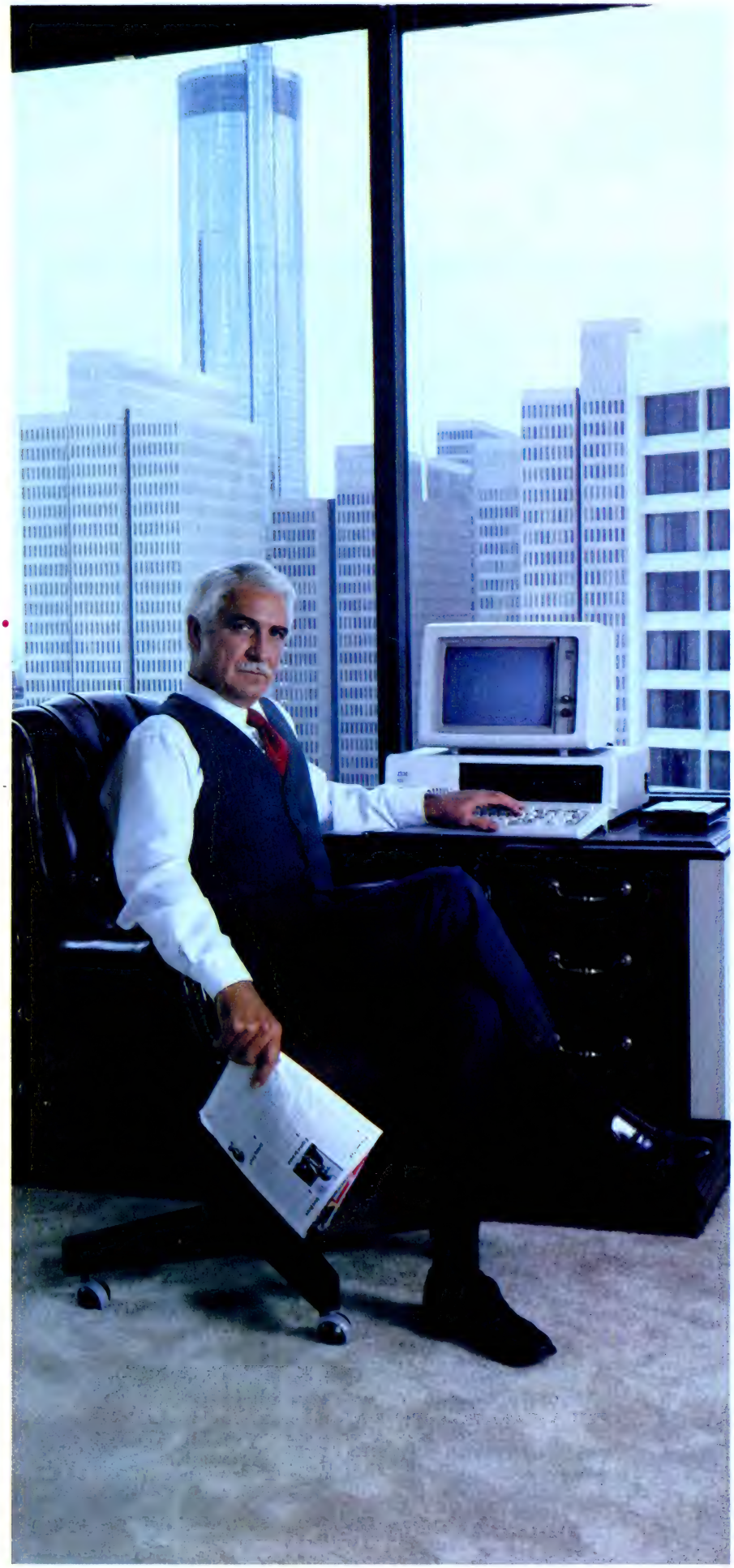


Chart generated from a spreadsheet program with graphics helped Jansen spot his weaknesses. The increase in his time after 35 km told him he needed more training.

Since Briscoe doesn't like to exert himself, he was attracted to the Health-Aide option of cutting down on a certain number of calories each day to take off the weight. And even when temptation got the best of him, the program provided Briscoe with the incentive he needed to continue his diet. "Before I got Health-Aide, I used to write down on a piece of paper what I weighed every day and put that on the mirror," he says. "Somehow, though, it wasn't encouraging enough. When I got Health-Aide, which gives you a 30-day chart, it really showed me how I was doing. So if I ate ice cream one night, I could see the next day that I didn't have to give up. I could still see that I'd made progress over the last 30 days."

Briscoe also found other uses for the program. "Aside from diet, one of the most instructive applications was the balanced protein," says Briscoe. "Health-Aide shows you all those different amino acids, which is what proteins are made of; which ones you're low in, and what kinds of food you could eat to balance them out. Throwing garbanzo beans into a tossed salad can make that a much more complete protein lunch (meaning you are getting the right amounts of the various essential amino acids). If I hadn't used Health-Aide, I wouldn't have known things like that."

Health-Aide has other features as well. It can provide shopping lists, for example, and analyze food costs (based on average prices, which you can edit and update as needed). You



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CIRCLE 25

We're only beginning to explore the use of computers in improving athletic performance.

can set a budget, and by substituting lower-priced foods with the same nutritional value, keep within it. And, according to Etheredge, the program is beneficial for people on special diets—runners, diabetics, etc.—who are very concerned about where their calories come from. Health-Aide prints out the percentage of calories from carbohydrates, proteins, and fats for these people.

Health-Aide is a pretty comprehensive program. But it is also a general program, and only one of several which will be of help to people who need to follow special diets for medical reasons. There are also programs geared specifically for such people, however. The Healthy Meal Planner, for instance, is a program designed for diabetics which allows them to plan meals which satisfy their own individual tastes while ensuring that they stay within their prescribed meal patterns.

Here's how it works: Based upon a person's preferences and medical needs, a dietician programs in the number of meals and snacks allowable as well as the allowable number of diabetic exchanges for each meal, such as ½ cup milk, one vegetable, one fruit, two breads, one fat, three meat or meat substitutes. From this prescribed pattern, the diabetic is able to plan meals that fit in with his personal meal pattern.

Creativity expands uses

One of the advantages of most of these programs is that you can be creative with them. People often give up on diets because the menus are sparse and boring. However, if you have a nutrition program with a large enough data base, you may discover you don't have to go into self-denial after all. Instead, you'll be able to plan menus in much the same way Judy Dyer does.

Dyer is chief nutritionist at the Kaiser Permanente Medical Care Program in Portland, Oregon, which has a weight-loss clinic. Last Thanksgiving, for example, she was asked to come up with a traditional Thanksgiving meal with all the trimmings, but which was high in nutrition and low in calories. She was able to develop two strikingly similar Thanksgiving dinners which had a major difference. By analyzing one serving of a typical Thanksgiving dinner, she found that it contained 1650 calories; then, just by doing such things as removing the skin (which is fatty) from the turkey, she came up with a Thanksgiving dinner which contained only 870 calories per serving without sacrificing food quantity or taste. Dyer used a nutrient data bank in a large computer to do her menu planning, but the more elaborate programs that are available for personal computers should be able to come close.

Another creative use for such programs is judging the efficacy of new fad diets. Best-seller lists are loaded with them, and dozens of new ones seem to come out every year. Finding a diet that's both nutritionally sound and appealing is like trying to find a dietary needle in a fad-diet haystack. That's where the computer comes in. Lillie Grossman of California State University, for example, decided to rate 30 of the top diets on a computer. Evaluating diets this way, she says, is both scientific and useful in gearing dieters toward healthy weight-loss strategies. "Say you buy a popular book. You take a three-day menu, put it into the computer, and evaluate it objectively. Then you have black and white, whether or not it has adequate protein and other nutrients." For example, Grossman and her computer have shown that the Scarsdale Diet is high in protein but low in calcium. So when someone wants to follow the diet, she says, "they know to add calcium-rich foods to the meal plan." (As with Dyer, the computer Grossman used had a very large data base, but most of the personal computer nutrition programs will do fine in this area.)

Creativity, however, need not be limited to food comparisons. In fact, if you already have a simple spreadsheet program at home, you have a valuable tool to keep track of your exercise program and/or athletic performance. Take the case of Leonard Jansen. He has been keeping track of his racewalking performance on a spreadsheet program (his also uses graphics) and it's helped him spot his weaknesses.

"I have a chart of a lot of races I've walked, and I keep my split times and then graph them so I can look at my fatigue times and try to figure out general trends," he says. "For example, I have a chart up on the wall in my office. It shows that at around the 35km mark of a 50km race, my time started to shoot up really drastically. First, I ask 'Why? Did I have a blister? Did I feel sick?' If it wasn't that, if it was just that I couldn't move my legs any faster, then I would say, 'Well, gee, around the 35km mark I'm getting weak.' I'd go back to my training log and again ask 'Why?' Based on my training, what could I come up with? The answer: I hadn't done enough long workouts over 35km."

Jansen says that for others to chart their races all they'd need is a general graphics package that would accept some sort of input. "Actually, almost any spreadsheet would do the trick, but one with graphics is best. It's very easy to see general trends, especially with something like an Apple or a TRS-80 that has decent graphics so that you can actually look at the plot on the screen. But whatever program you use, you just have to know how to work it pretty well. Instead of plugging in earnings, you plug in pace per mile or split at a particular point, or whatever your intention is."

But that's just the starting point, says Jansen, who is also the assistant director of computers in the sports medicine division at the Olympic Training Center in Colorado Springs.

(continued on page 156)

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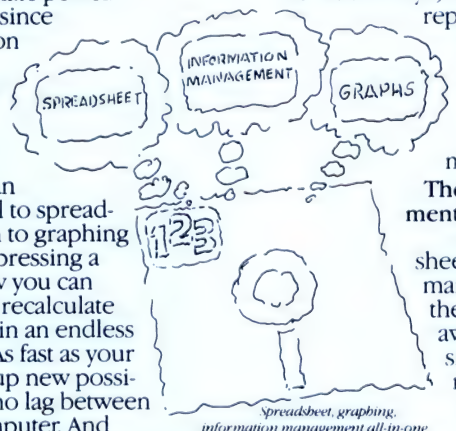

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The spreadsheet function.

If 1-2-3 were just a spreadsheet, you'd want it because it has the largest workspace on the market (2048 rows by 256 columns). To give you a quick idea of 1-2-3's spreadsheet capabilities: VisiCalc's spreadsheet for the IBM PC offers 15 arithmetic, logical and relational operators, 28 functions and 32 spreadsheet-related commands. 1-2-3 has 15 operators, 41 functions and 66 commands. And if you include data base and graphing commands, it actually has 110!

In addition, 1-2-3 is up to 50 times as fast as established spreadsheets. With all the features you've ever seen on spreadsheets. 1-2-3 also gives you the capability to develop customized applications (with 26 macro keys) and lets you perform repetitive tasks automatically with one keystroke. If 1-2-3 were just a spreadsheet, it would be a very powerful tool. But it's much, much more.

The information management function.

Add to 1-2-3's spreadsheet a selective information management function, and the power curve rises at an awesome rate. Particularly since 1-2-3's information management capability reads files from other programs such as WordStar, VisiCalc and dBase II. So you can accumulate information on a limitless variety of topics and extract all or pieces of it for instant spreadsheet analysis. Unheard of before. Specific 1-2-3 information management features include sorting with primary and secondary keys. Retrieval using up to 32 criteria. 1-2-3 performs statistical functions such as mean, count, standard deviation and variance. It can produce histograms on part or all of the data base. 1-2-3 also allows for the maintenance of multiple data bases and multiple criteria.

The graphing function.

1-2-3 enables you to create graphs of up to six variables using information already on the spreadsheet. And have it on screen in less than two seconds! Once you've made a graph, three keystrokes will display it in a different form. If data on the spreadsheet changes, you can display a revised graph with one keystroke. This instant relationship of one format to another opens up a whole new application area. For the first time graphics can be used as a "what if" thinking tool!

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CIRCLE 26

When You'd Rather Switch Than Swap . . .

The new integrated business packages may be the way out. But there are some limits to what you can do with them

by Paul Bonner, Associate Editor

A businessman working with a word-processing program on his IBM Personal Computer wants to send a letter to one of his customers. He issues a single keystroke command to his computer. Automatically, the screen display changes to show his data-base program, from which he calls up his record for that customer. He issues a few simple commands to pick up parts of the record in the order he wants, and puts them in a transfer buffer—without disturbing the contents of his data-base record. With another keystroke, he switches back to his word processor, and empties the contents of the memory buffer onto the screen, providing the entire heading for the letter without having to type a single word.

The businessman we've described is using an integrated applications package, one of a new genre of software among the hottest items on the personal computer market today. Although different manufacturers are taking different approaches to these packages, their goal is the same: to help you do a lot more with your personal computer by eliminating a lot of the hassle associated with going from one application to another.

When you're working with a stand-alone applications package such as a spreadsheet program or a word processor, all too often you encounter a mountain of difficulties when you want to do something as simple as inserting your spreadsheet data into a letter you're preparing with your word-processing program. Lou Maull IV, the businessman we described above and the president of Louis Maull Company, a St. Louis-based manufacturer of barbecue sauce, describes the difficulties he used to encounter working on an IBM Personal Computer. "If I were typing a letter to a broker," he says, "and I wanted to check his sales figures for the last three months, I had to shut down WordStar, switch over to VisiCalc, run out his report, shut down VisiCalc, bring WordStar back up, and then try to copy the stuff in. That's a lot of trouble." As a result, Maull says, "I had three computers,

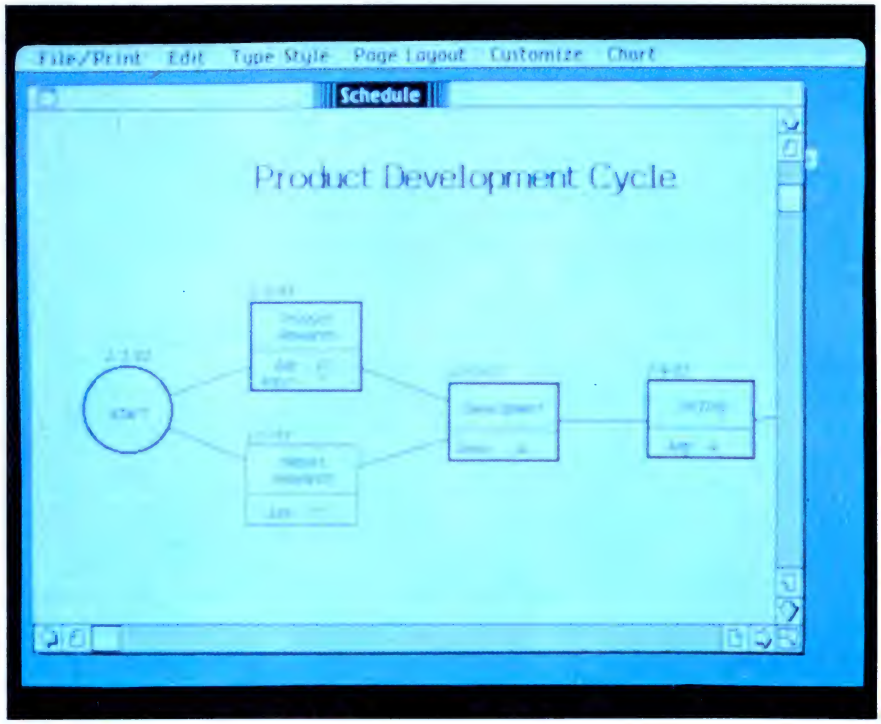
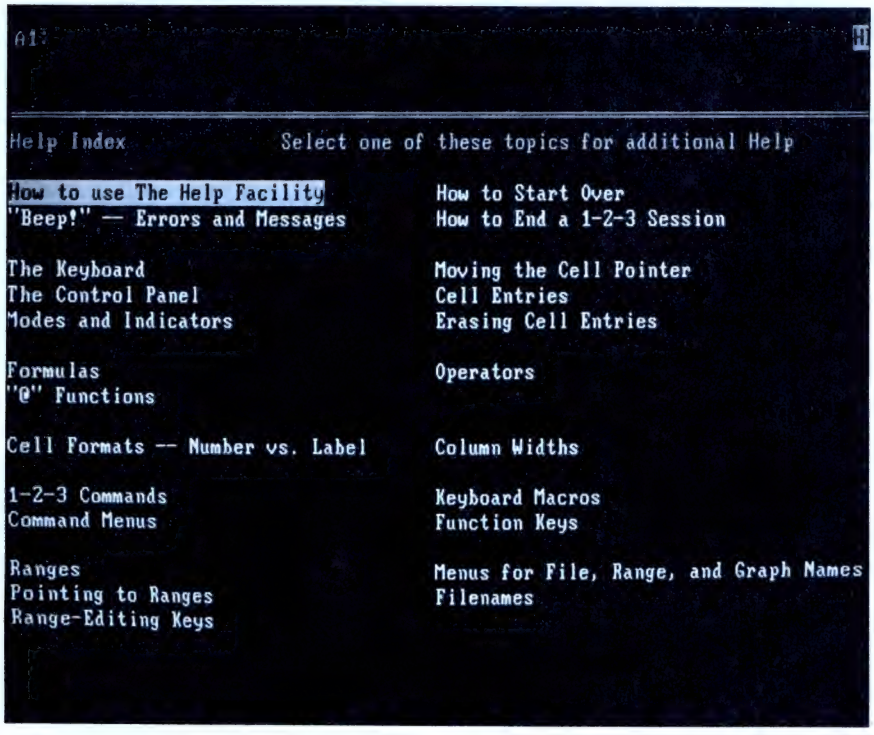


Photo courtesy of Apple Computer, Inc.

LisaProject, a critical-path scheduling tool, is part of Lisa's integrated software package. The entire Lisa package was designed to make movement between applications easy.



User-friendly features such as "HELP" screens—here from Lotus 1-2-3—are important in integrated packages. The "HELP" screen identifies the page in the manual.

because they were strictly single-task machines. One was for word processing, one for data-base management, and one for VisiCalc."

A solution

The problems Maull encountered in going from one application to another are hardly newsworthy. But what is interesting about Maull's story is that he found a solution to those problems in a program called Memory/Shift, from North American Business Systems of St. Louis, Mo. Memory/Shift is an operating environment which allows Maull to load up to nine applications programs into separate compartments of his IBM Personal Computer's memory at once, and to move data between applications with simple cursor-defined commands. Now, Maull says, "All three of my computers can do all three jobs. I'm able to go back and forth between applications programs for reference, and with the memory transfer feature I can pick up information from one program and put it into another." For example, Maull says, "I use VisiCalc to make broker reports. The brokers get bonuses based on whether or not they meet their quotas. So I'm able to suck up certain parts of those reports, flip over to the letter I'm going to send them, and put the VisiCalc information right there in the letter."

Operating environments such as Memory/Shift are only one approach to applications integration. Others include integrated hardware/software systems, such as Apple's Lisa; integrated programs presenting several applications on one disk, such as Lotus 1-2-3 manufactured by Lotus Development Corporation in Cambridge, Mass.; and integrated series of stand-alone programs sharing a common command structure and common disk file format, such as the PFS series from Software Publishing Company in Mountain View, Calif.

The manufacturers of these products have recognized that the personal-computer user is not adequately served by single-purpose software that turns his computer into a dedicated machine. Of course, a number-crunching spreadsheet is invaluable to a financial analyst, but that analyst also needs software that lets him work with words and pictures if he is to get full benefit from his computer. According to Barry Smith, Lisa product manager at Apple, "The reason that integration is important is that you could, with stand-alone packages, look at information in different ways, but the overhead is extreme . . . The concept behind integration is to provide a systems tool that more closely parallels the way that knowledge workers think and operate with information. It allows people to explore information and look at it in different ways, and to be more effective at making decisions and communicating those decisions."

Chris Morgan, vice president of communications at Lotus, adds, "You find, as you use integrated software, that it's a real joy to be able to look at the spreadsheet and then graph it in a short period of time without the disk switching and the waiting that goes along with it. That counts for a lot. We've found that people are apt to do more things and experiment more if they don't have to wait. If it takes you five minutes to create a graph, you're not going to create many graphs. But if you can do it in 10 seconds, then you're apt to try all kinds of different combinations. You find out very quickly that your productivity goes up, and that you can think in different ways about what's going on with your project."

Ray Larsen, president of Odin Electronics, an import/export firm based in San Jose, Calif., uses the PFS software series on an Apple II computer. He describes the increase in productivity this way: "We run a $2 million sales operation here with two people. If we didn't have this system, we would probably need three or

"People do more things and experiment more if they don't have to wait."

four more people," Larsen says.

Many integrated packages are centered around one application, such as data-base management. The limited storage capacities of floppy disks make this especially true of programs offering multiple applications on one disk. With such programs, any attempt to provide an encompassing range of applications is likely to result in none of the applications being implemented especially well. According to Kaz Ochi, a financial consultant in Newport Beach, Calif., the potential buyer of integrated software should look for a program that's very good at the two or three tasks he needs most often. For his financial analyses, Ochi uses Lotus 1-2-3, a package incorporating a spreadsheet, data-base management, and business graphics. He singles out the spreadsheet for special praise: "I've been in this business for 17 years now. I've been through every aspect of the data-processing industry, and I've been using spreadsheets since our first ones were on mainframe computers. Lotus 1-2-3 is more powerful than any of the mainframe packages."

Cliff Bradley, a computer salesman at Compuco in New York City, recommends the Epson QX-10 as an integrated system with strong word-processing capabilities. The Epson system includes an integrated software package called Valdocs, which incorporates word processing, calculator functions, business graphics, electronic mail, a clock/calendar, scheduling, and information management. According to Bradley, what makes Valdocs stand out from other word-processing packages or integrated applications is its ease of use. "In general," he says, "Valdocs is very easy to use, and consequently the learning curve is very fast. If you sit down with someone, he can become competent on the machine in two or three hours." Susan Lee, economics columnist for *Vogue* magazine, says the simplicity of the Valdocs system was the deciding factor in her purchase of a QX-10. "I looked at Texas Instruments and I looked at the DEC, but they seemed too complicated."

Ease of use is a common theme in integrated software. Referring to the extensive interactive tutorial that accompanies Lotus 1-2-3, and to the more than 200 HELP screens available to the user while the program is running, Chris Morgan says, "We find that people like to sit down and immediately start using the program; they don't like documentation. So it's a case of waking up to the realities of the marketplace; it's just common sense. We feel that if you don't do this kind of thing, you're not really serving the customer."

All-in-one packages

Context Management Systems has taken a different approach to integrated software, with Context MBA—a package offering spreadsheet, word-processing, data-management, business graphics, telecommunications, and custom forms capabilities in a single program. Context MBA was one of the first integrated packages on the market, and it remains one of the most complete. However, the program has been criticized for being difficult to use, and for being very slow at certain tasks, such as recalculating a spreadsheet or drawing graphics on the screen. A computer research study commissioned by Lotus Development Corporation, and carried out by the Garther Group, reported that Context MBA was three times slower than Lotus 1-2-3 for "real" model development. However, Context Management Systems has since released an updated version of MBA that reportedly executes tasks somewhat faster. In addition, Context Management points out that a task such as inserting spreadsheet data into a text report is executed much faster with

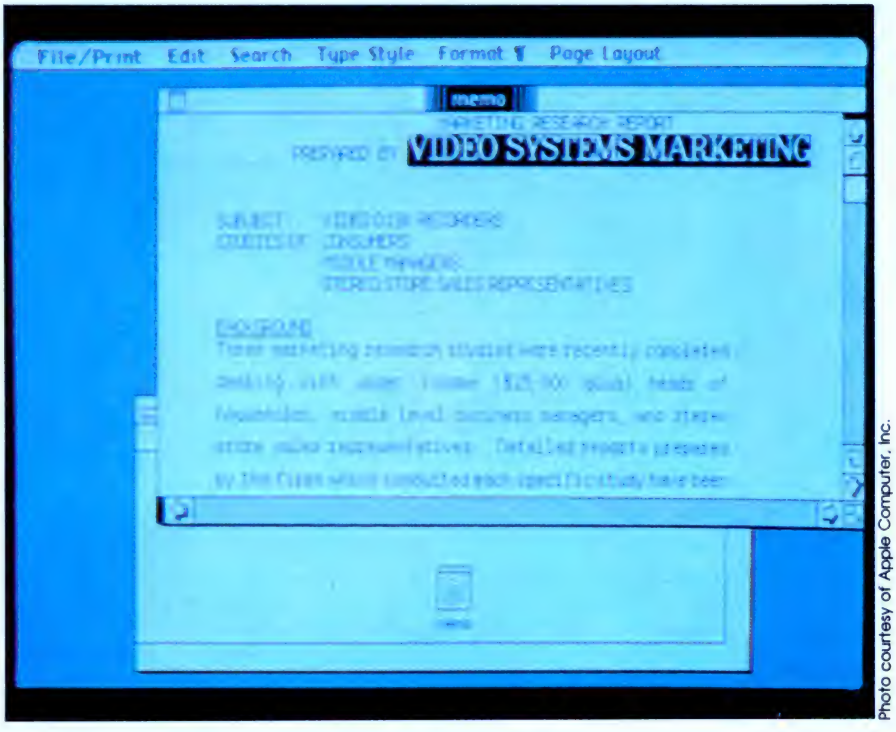
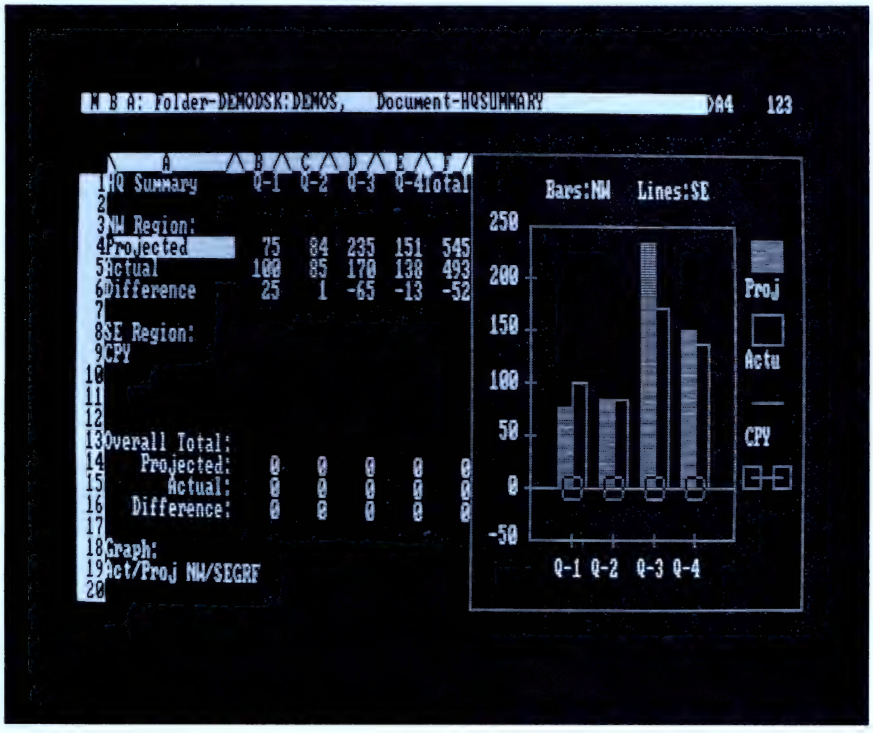


Photo courtesy of Apple Computer, Inc.

Lisa utilizes screen icons and a "mouse" in lieu of keystroke commands to control functions such as cursor control, file handling, and movement between applications.



The ability to graph spreadsheet data, as shown here with Context MBA, provides the analyst with another way to look at information, and a source for new insights.

MBA than with Lotus 1-2-3, which requires leaving 1-2-3 to load a word-processing program, and then reload the spreadsheet data.

T/Maker III is a multiple-application package that includes spreadsheet, word-processing, data-base, and graphics functions. Phillip Woelhoff, the director of marketing at Westico in Norwalk, Conn., the company that distributes the program, says that T/Maker III is unique because of the quality of its integral applications. The spreadsheet is unusually flexible, giving the user total freedom in the placement of data rather than restricting him to an unalterable rows-and-columns format, and the word processor includes features normally found only on advanced word processors, such as the ability to produce footnotes. Woelhoff says, "We've used T/Maker for three years for all of our financial planning and projections. We operate both 8- and 16-bit machines using T/Maker. As far as we're concerned, it's the best integrated software for data and text manipulation around." He adds, "And we have access to any program on the market."

Apple has also made a move toward all-in-one integration with Lisa, its new executive workstation. Lisa's integrated software package includes a spreadsheet, word processor, data-base manager, project planner, graphics drawing system, and business graphics, all tied together by a system manager that allows the user to move freely from operation to operation. The system also includes a multiwindow display, screen icons instead of text menus, and an electromechanical control device called a mouse that's designed to simplify applications selection. Tony Morris, president of Morris Decision Systems, a computer retailing and consulting firm in New York City, says, "What appeals to customers about Lisa is the unique way in which the user interacts with the computer. The important difference between Lisa and keyboard-oriented systems is that with a keyboard, you have to remember the command you're supposed to type, and then type it in. With Lisa, you look at the screen and point at what you want, so the overhead that goes with getting things done is decreased dramatically." "You can buy the individual application components of Lisa for other computers," Morris adds. "But what you can't get is the degree of integration and the degree of elegance of implementation—elegance meaning that it's properly and fully executed."

Lisa is an expensive system, costing close to $10,000. According to Morris, "Price is not irrelevant, but price is less important to potential Lisa buyers than whether it will do what it's supposed to do. The biggest hurdle in selling Lisa is that the product must be demonstrated. You can talk about Lisa until you're blue in the face, but you can't believe what Lisa is capable of doing until you actually see it. For that $9995, the customer is getting a very powerful hardware platform, revolutionary software, and something that has open-ended architecture, so it will ultimately have more applications than it has now."

Lou Maull questions the advantages of buying a fully integrated hardware and software system such as Lisa. "If I buy Lisa," he says, "I get something that's integrated, but I don't necessarily get the best calculator program or the best word processor; I'm not allowed to select the best program."

"That's a reasonable complaint," says Tony Morris. "But I think the trade-off is going to be that what you give up, perhaps, in ultimate performance within an application, you make up on the integration capabilities and the ease of transfer. If you look at the overhead that goes with handling disks and moving from VisiCalc to VisiPlot, the question at hand

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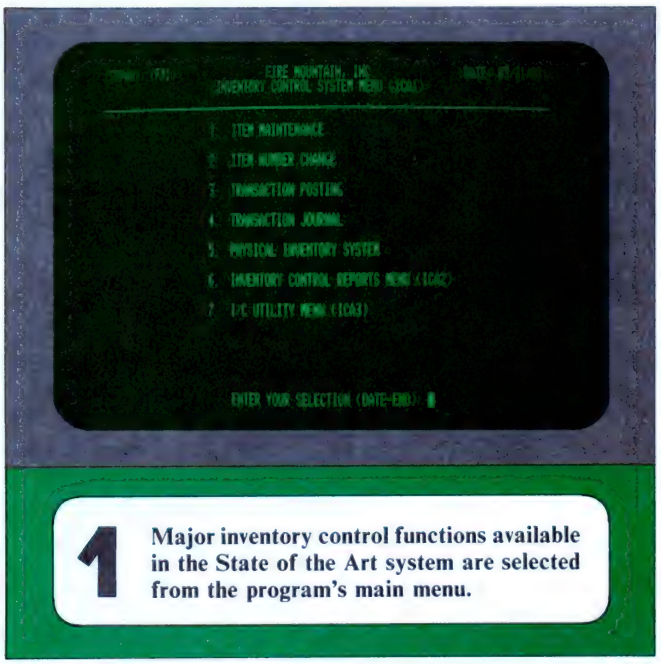
Are Missing Bolts Driving You Nuts?

A computerized inventory control system can tell you what you've got and where to find it as soon as you need to know

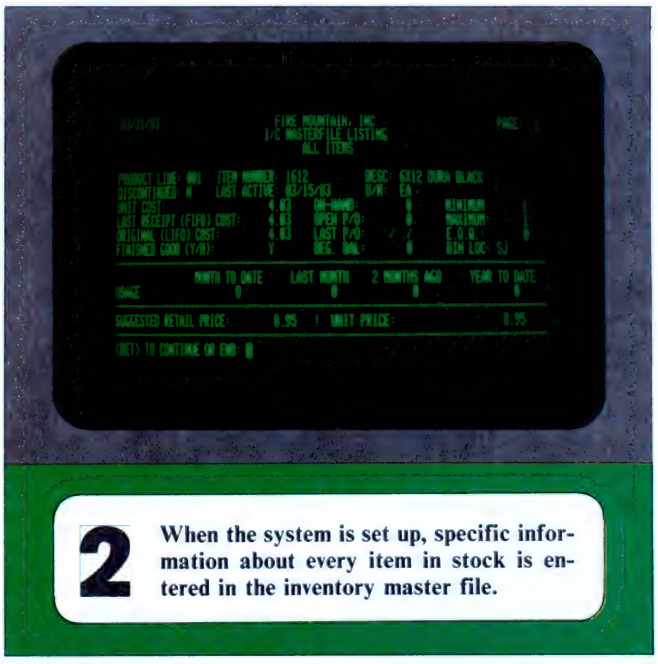
by Charles Rubin, Associate Editor

Inventory, that collection of parts or merchandise that represents a substantial investment to most businesses, can also be a substantial headache when it comes time to count, value, or otherwise control it. Keeping track of thousands of diverse parts and their ever-changing prices or costs is something humans just aren't built for, but fortunately, computers are tailor-made for the job. Whether the business is sales, distribution, or manufacturing, personal computers can maintain up-to-date information about inventory levels and offer valuable reports that improve asset management, production planning, marketing, and customer satisfaction. The switch to computerized inventory control also pays off in reducing the amount of time spent on maintaining current records. And thanks to new, sophisticated software, the changeover isn't nearly as painful as it might appear.

When Fire Mountain Fireplace hired Mark Sheehan in July 1982, they had plans to expand beyond their one-store retail operation in San Jose, Calif. Sheehan had experience in computer inventory management, and he knew that the expansion would be difficult to accomplish under the existing inventory conditions. "At the time," Sheehan recalls, "we had about 2000 items in stock in one store, and the inventory system didn't exist." Infrequent physical inventories were the only method for keeping track of on-hand quantities. Reorder times were based on educated guesses (which meant goods often sat unsold for long periods of time), and the only way to tell how much money was available for a purchase was


FIRE MOUNTAIN, INC
INVENTORY CONTROL SYSTEM MENU (ICA1)
1. ITEM MAINTENANCE
2. ITEM NUMBER CHANGE
3. TRANSACTION POSTING
4. TRANSACTION JOURNAL
5. PHYSICAL INVENTORY SYSTEM
6. INVENTORY CONTROL REPORTS MENU (ICA2)
7. I/C UTILITY MENU (ICA3)
ENTER YOUR SELECTION (DATE-END):

1 **Major inventory control functions available in the State of the Art system are selected from the program's main menu.**


FIRE MOUNTAIN, INC
I/C MASTERFILE LISTING
ALL ITEMS
PRODUCT LINE: 001 ITEM NUMBER: 1612 DESC: 6X12 DURA BLACK
DISCONTINUED: N LAST ACTIVE: 03/15/83 U/M: EA
UNIT COST: 4.83 ON-HAND: 0 MINIMUM:
LAST RECEIPT (FIFO) COST: 4.83 OPEN P/O: 0 MAXIMUM:
ORIGINAL (LIFO) COST: 4.83 LAST P/O: 7 E O Q:
FINISHED GOOD (Y/N): Y BEG BAL: 0 DIM LOC: SJ
MONTH TO DATE LAST MONTH 2 MONTHS AGO YEAR TO DATE
USAGE 0 0 0 0
SUGGESTED RETAIL PRICE: 8.95 UNIT PRICE: 8.95
(RET) TO CONTINUE OR END:

2 **When the system is set up, specific information about every item in stock is entered in the inventory master file.**

The inventory system had to be both flexible and powerful.

to look in the company checkbook.

Under these unlikely conditions, Fire Mountain began to expand rapidly. A second store was opened in July. A statewide wholesale distributorship was started in October. In November, Fire Mountain began representing several wood stove manufacturers throughout the western states. The business was incorporated in December. "I knew we would need a computer system sooner or later," Sheehan says, "so I began setting up an inventory system on paper."

Building an inventory system

As Fire Mountain's expansion got underway, Sheehan began organizing the inventory into a system with seven-digit code numbers for each item. "The first two digits indicate which of our operations the item belongs to (retail store, distributorship, or manufacturer's rep), the next two indicate the vendor number, and the last three are the part number," says Sheehan. He made sure that the part numbers were descriptive. If a part is a sheet metal fitting, for example, the last three digits of the item number indicate the size, length, and pitch or angle of the fitting. "That way," he says, "I can tell what a part is without even looking at the description."

By the end of the year, it had become necessary to maintain inventory records for some 4500 items stocked by the four business entities. To complicate matters further, the four operations didn't carry identical lines of merchandise—some items were common to all four operations, while others were unique to one operation. And the items were supplied by more than one vendor. "It was taking me 45 minutes to an hour a day to keep the inventory up to date," Sheehan recalls.

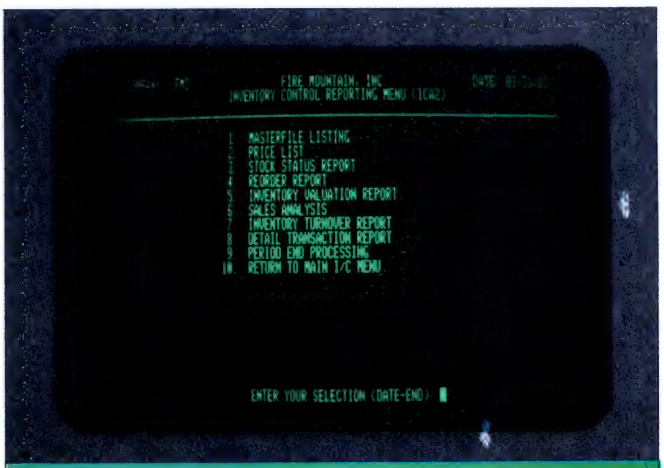
The search for a computer system began in October, but the company didn't make a purchase until January of this year. The system had to be flexible enough to serve the needs of each Fire Mountain operation, and yet powerful enough to provide an overall picture of the inventory status. Sheehan remembers, "I wanted to be able to know exactly what we had in stock for each business, and what was in the process of being shipped, both to us from suppliers and from us to other stores we sell to. I also wanted to be able to tell our customers when they could expect deliveries, and I wanted to know where all our accounts were at any given time." The manufacturer's representative business had an inventory of 500 different items in six product categories. Sheehan needed to know what was on order from each manufacturer, the value of Fire Mountain's outstanding purchase orders, and how soon they could expect delivery to individual customers throughout the western states. In the wholesale distributorship, some 1500 items in 20 product categories were being marketed statewide. In the two retail stores, Sheehan wanted to store multiple pricing levels for some 2000 items in 48 product categories.

Taking delivery

After looking at micro- and minicomputers for four months, Fire Mountain bought an Apple III system with two floppy disk drives. They chose inventory control and general ledger software from State of the Art in Costa Mesa, Calif.

The State of the Art inventory system maintains records of all inven-

3 **A separate price list can be generated for use as a convenient reference when pricing new stock or discounting items.**



4 **The reporting function provides easy access to a variety of detailed reports about aspects of the inventory.**

tory items on a master list. The list has spaces for product category, number, description, prices, cost, quantity on hand, date of last purchase order, safe minimum quantity, maximum quantity, month and year-to-date sales activity, and even the location of the item in the warehouse by bin number. When it figures the value of the inventory, the program allows the option of using the last or the average cost of an item.

Once a day, Sheehan spends 15 minutes updating the inventory records on the computer by entering data from the latest invoices, sales slips, delivery receipts, and purchase orders. The master file listing of each inventory item can be called up by entering the item's seven-digit number. Because his inventory software is integrated with his general ledger software, the changing inventory values also show up on the books. "We always know where our accounts are," says Sheehan.

Reports for strategy

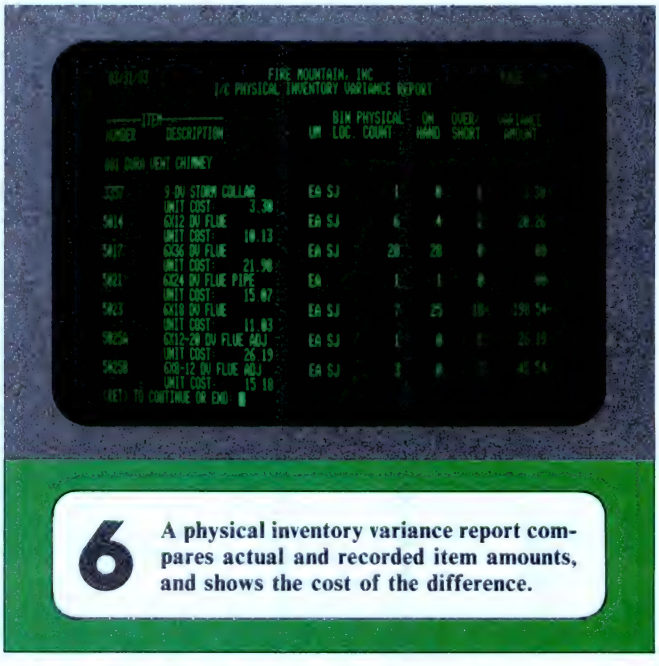
"I'd say we use about 70 percent of the reports the system will generate," Sheehan says. Having a record of estimated delivery times for each item helps in planning purchasing for retail items, for example. "Our busy selling season is between August and mid-February. We know exactly when to order new stock so it'll arrive soon enough to sell, but not so soon that it sits around. That saves us money."

The physical inventory variance report has also been useful. Physical inventories are now taken once a month at Fire Mountain. The computer's report compares actual amounts on hand with the computer records, then shows the unit cost of each item and the value of the difference. "In the old days," Sheehan says, "we used to reorder when we were almost out of an item." It might take several weeks to get a new supply, which meant sales might be lost because the stock on hand was depleted before the new order arrived. The reorder report in the system will print a listing of items which have fallen below a safe inventory level, and will suggest reorder quantities. When reorder information is combined with the data on estimated delivery times and information about receivables from the general ledger, Sheehan can plan each purchase so that neither goods nor ready cash go unused for very long.

Hindsight

"I'm very happy with the system," Sheehan says, but there is one aspect of Fire Mountain's switch to computer inventory control that he would have changed if given a second chance. "We got the Apple with two floppy disk drives," he says, "but that really wasn't adequate for us." Although the inventory program was on only one diskette, the State of the Art system can only store a maximum of 500 inventory items on each data diskette. With an inventory the size of Fire Mountain's, Sheehan was soon swapping about a dozen data diskettes in and out of a disk drive. "State of the Art was working on an interface with a hard disk when we bought the software in January," Sheehan says, "and when it came out six weeks later we switched to a hard disk right away." Now, all the firm's records and the program software are stored on a 10 Mbyte hard disk. "So far," Sheehan says, "we've used

5 The reorder report highlights the items that are in short supply, and can also recommend optimum ordering amounts.



6 A physical inventory variance report compares actual and recorded item amounts, and shows the cost of the difference.

Thanks to the computer, neither goods nor cash go unused for long.

CHOOSING THE RIGHT INVENTORY SOFTWARE

There are hundreds of inventory control programs available, ranging in price from under $100 to thousands of dollars. The features and capabilities of these programs vary widely, but there are several basic points to consider before you invest in a package:

1. Is the file size adequate? Make sure the program can store enough inventory items to meet your needs—both now and in the future. Anticipate a reasonable amount of growth, so you won't have to transfer from one software package to another as your stock grows. Along with the maximum number of items stored, you'll also want to check the number of digits allowed in item codes. For example, if you have several thousand items in inventory and the software will only allow three user-defined item codes, you'll be in trouble.

2. Will it fit your system? If you already have a computer, you'll want inventory software in a compatible format. If you have an 80-column printer, for example, make sure the inventory package doesn't require a 132-column printer (unless you plan to buy one). Find out how many disk drives are needed to run the package. You'll probably need at least two, but the program might not be easy to use unless you have three drives, or perhaps a hard disk. Find out how many files can be stored on each disk, and figure out how many disks it will take to store all your inventory items. Then, if you're not comfortable swapping that many disks in and out of a disk drive, you might want to invest in a hard disk and software that will interface with it.

3. Will the package allow printing on standard business forms? That bargain-price inventory program might not be such a bargain when you find out it won't format its data to fit standard invoices, packing slips, checks, or other business forms. Large business printers like Moore Business Forms make tractor-feed forms for computer printers. Their catalogs usually state which software packages are compatible with their forms. Software manufacturers will usually make a point of stating that their package prints on standard forms, if it does.

4. Is the software contained on one disk, or on multiple disks? Single-disk software can be an advantage, because often such programs enter price, cost, or quantity changes into all relevant files at the same time. On the other hand, some users like having the software on multiple disks for added security.

5. Is the package integrated or stand-alone? Many inventory programs are part of integrated accounting packages, some of which require the use of other accounting modules from the same vendor in order to run. Others simply allow the option of integration with general ledger or order entry modules from the same vendor. Some integrable software will run with third-party software, including general ledger or even database management programs.

6. Does the program organize and report data in a useful way? Different users like their inventory data presented in different ways, and no package can satisfy everyone. Look at the sample reports a package produces. Make sure they contain the kind of information you want presented in the way you want it. For example, can reports be generated for specific ranges of items as well as for the entire inventory? Are inventory valuation reports based on average cost of items—first cost, last cost—or do you have a choice of how you want the value calculated? Will item listings display more than one price? Will the program display your profit margin based on the price you select? Some features will be important to you, and some won't.

7. Are errors easy to correct? Programs handle data-entry errors in different ways. In some packages, data entry is on-line, and errors must be cancelled by making a reversing entry. Many packages prompt the user to check the data entered before hitting the RETURN or ENTER key to update the records on disk. Still others use a batch processing method, in which, for example, 20 changes in item files aren't posted until after the last entry is made. The user can review the entries in a batch as well as individually.

8. Is the program easy to use? As with any software, ease of use must be balanced with flexibility. A package that takes 15 minutes to master probably won't allow many options for formatting or organizing data. Most packages are menu driven, so the user accesses various files by choosing from a main menu, and then from a submenu which offers options within that particular function. Some programs require a change of program disks to access certain functions. Many packages provide templates for fill-in-the-blank data entry to master files. Most programs have at least some on-screen prompting that directs the user through various functions. The need for such ease-of-use aids will depend on the user's level of experience. Some experienced users find multiple menus and prompts a time-consuming nuisance.

9. Is the package well-supported? Most manufacturers of accounting software are constantly updating their products. You'll want to know whether your package can be updated, and if so, whether you'll be charged for the updates. Also, find out if there's a technical assistance hot line to call if you have problems with the program. The best way to find out the truth about product support is to get the names of some users from your retailer or consultant. Try to find a user whose application is similar to yours, and who has been working with the program for a while. Try to get his point of view on ease of use, friendliness of the documentation, and other important factors.

Will it work for your accountant? Check with your accountant to determine his requirements. The accountant may be using integrated accounting software that has an inventory control module suitable for you. Your inventory data could then be transferred to the accountant on a disk, avoiding time-consuming data entry. On the other hand, the accountant may be willing to work from a printout you provide.

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CIRCLE 40

"We can determine the cost of either finished parts or subassemblies."

about 5 percent of the hard disk's capacity, so we won't outgrow it."

By helping him to manage his inventory and assets more efficiently, Sheehan estimates that the computer could increase Fire Mountain's profits by 25 to 30 percent. Since the company's volume is in the neighborhood of $100,000 a month, and profit margins in this type of operation usually run around 30 percent, it doesn't take much math to figure out that the computer was well worth the investment.

Getting off on the right foot

At Medical Instrument Development (MID) Laboratories in San Leandro, Calif., inventory control is safely in a computer's hands as this start-up manufacturer of eye surgery equipment gears up toward full production.

"We've been in business for two years," says vice president and general manager Bill George, "but up until a few weeks ago all of that time was spent in research and development of our product line." Because of his previous experience with an Apple computer and VisiCalc at another company, George was well aware of the advantages of computing in business. He planned from the beginning to have a computer take care of MID's accounting and inventory, but he also knew that implementing the system would have to wait. "During research and development," he says, "we were evaluating various parts in prototype products. We'd try some different parts and decide against using them in the finished product." Since he knew the company wouldn't end up including all the trial parts in the finished product, it was inappropriate to spend a lot of effort getting the temporary inventory on a computer. The inventory hovered at around 300 items at the time, and it was controlled by a card file. The system was a good one, however. MID Labs used a standard engineering system for numbering parts. Each part was assigned a seven-digit code number, with the first two digits indicating the class of the part (either finished goods, raw materials, or an assembly, labor, or process) and the last five digits indicating the actual part number.

Human effort, human error

As refined as the numbering system was, there was too much human effort required in maintaining inventory records for accuracy to be possible. When the production department received a work order, there was no way of knowing whether or not there were enough parts in stock without actually looking in the storeroom. If an item was out of stock, the production worker would pull the card from the file and ask the purchasing agent to reorder. The purchasing agent had to search old invoices manually to determine the last price paid for the part, and often had to guess at how many parts to order without knowing what the actual production needs would be. Also, parts would become obsolete as the company's engineer made substitutions, but purchasing would reorder them anyway because they hadn't been deleted from the card file. Says George, "Having a bunch of obsolete parts sitting around can really destroy your profit picture at the end of the year."

Computing at last

When MID Labs began moving out of the research and development phase towards marketing and production, George hired Barbara Solso as inventory manager and bought a computer. A consultant recommended a CompuPro system for the hardware, but finding the right software wasn't so easy. "Most of the programs out there were ideal for retail applications," George says, "but it was hard to find one for manufacturing."

"We saw an ad for a package from Microcomputer Consultants (Davis, Calif.). We ordered the manual, and Barbara read it over in one day. Then we ordered the program the next day." According to Solso, it was "pretty easy" to set up the inventory system on the computer. Her total computer experience consisted of one introductory computer class, but she was able to get the new inventory system working in less than a week. Putting the actual part numbers and other information on the master list only took a day and a half, she says, even though the inventory control needs at MID Labs are fairly complex.

Cost breakdowns made easy

The inventory system from Microcomputer Consultants helps avoid duplication of parts in the inventory file by separating all the parts into bills of materials. An assembly containing 20 parts, for example, would be listed in the system in at least two ways. On the bill of materials for the entire product, the assembly would be listed as one "part," but there would also be a separate bill of materials for that assembly. If, in turn, one of the 20 "parts" listed on the assembly's bill of materials was actually an assembly itself, there would be a separate bill of materials for that assembly, and so on. This system makes it possible to keep track of each individual part, and yet allow the parts to be grouped together when they are used in subsections of the complete product.

Information on any part or range of parts is available from the program's main menu. The function desired (such as stock file maintenance, bill of materials maintenance, issue listing, requirements report, physical inventory worksheet, work in progress report, and others) is selected by number, and then information is changed, added, and deleted, or reports are generated by keying in the numbers of the parts or range of parts desired. An Inventory File Adjust-

(continued on page 165)

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CIRCLE 27

It's Your Decision

You're going to decide the way in which your company uses computers. Soon. Here are the real issues

by Ernest Baxter, Managing Editor

The fact that American Industry is tripping over itself to computerize could only come as news to someone who has spent the last 10 or so years in a cave. Indeed, so prevalent has computerization become that the industry's buzzwords now appear regularly in Sunday's crossword puzzles. And there is hardly a board of directors in the land which doesn't know that a decision against computerization means 10 points on the big board.

But in this rush, in this stampede of the kind last seen in Buffalo Bill's American West, issues have emerged, important issues, issues which will mean the difference between whether or not the central tool of the Information Age, the computer, is used simply as another device to support the unnatural extension of the life of the Industrial Age, or whether its use will mean the dawn of an era unique in history and marked by personal creativity and productivity, of personal involvement in personal production, of caring about a company, of feeling a part of something to be proud of; something worth contributing to.

Two words, used as descriptors, identify these two profoundly different approaches to the use of the power of computing. The final choice of one approach over the other holds within it the seeds of the future for American Industry and, by direct linkage, the place the nation will hold in the halls of world leadership. As well, one approach attacks, while the

other defends, the precepts our democracy is based on. One approach, the archetype of the Industrial Age—and embodied by the auto industry—has proved too old, too fixed in its ways, too concerned with repelling the advance of the new age, to change and adapt. So it crumbles from within, imploding on ideas and ways of doing things which have lived beyond the time of the problems those ways were designed to solve. It sits like a thin, angry old man, frightened beyond measure of impending death, tired beyond measure of living.

The other descriptor is alive with potential, with the opportunity to make a quantum leap into the future.

The first approach is institutional, the second personal.

Simply stated, institutional means that computers are brought into a company and hooked up one to another in production line fashion. Limits of use are imposed on every machine to accomplish one very specific segment of a larger job, the product of each machine assembled at the end of the line into one whole unit. No deviation is acceptable, and the fact that each machine is capable of doing other things, even on the same job, is thought to be counterproductive. The machine's functions are tested and then more tightly proscribed until a point is reached where no matter what is done to it, the machine will only do that portion of the job it has been limited to do.

A person is brought in and instructions are given on the way in which to operate the tool. Even then, the process of refinement of limitations goes on. Very snortly, all possibility of personal initiative in terms of using that tool more productively has been designed away. At that point the product itself is redesigned to accommodate the limitations already imposed on the tools of the producer. The quality of the product, the quality of the producer, and the quantity of the company's bottom

line all suffer from this process.

Inevitably, the market reacts as soon as it has the opportunity. Again, the recent spectacle of the American auto industry is instructive. Shoddy products, designed to accommodate the limitations of the tools on the line, were rejected as soon as the marketplace was presented with an alternative. High interest rates, spiraling wages, and a recession are the reasons generally given for the debacle in Detroit. But the process of rejection of shoddy products had already begun and a strong case can be argued that interest rates and recession simply accelerated the matter.

From a motivational point of view, it is hard to reconcile the need for employee involvement in product quality with why employees should want to try to be involved beyond limitations already imposed by the tools they have been ordered to use. Feedback from important sources down in the trenches of production is seen in the context of the philosophy of limitations. Ideas which would in any way attack the concept of limitation are tossed aside before they clear the production area. The only option left the employer is the simple quantification of output by units. And as any department head in this position will explain, it is all uphill from there.

On the other hand, personal means an exploration of the potential for individual productivity, a potential unencumbered by arbitrary constraints imposed before the individual appears on the scene. It means individuals are offered an opportunity, presented to them by the power and versatility of the computer, to accomplish their jobs in ways which are limited only by their own initiative, their own creativity, their own will to succeed. No limitations are imposed on the tools with which they work. The tool itself becomes an extension of the mind of the user. While there is no reason to suppose that every employee will be so challenged, so turned on to the new opportunity as to seize it by the throat, the Japanese experience does lend some credence to the perception that there is wisdom in unchaining the people who produce the product.

In the personal context, individual motivation is somewhat easier to see because challenge is built into the tools the person is given to use. An employee's perception of job-related rewards changes dramatically as he begins to realize the potential not only for increased productivity but for self-fulfillment. A kind of in-house competition comes into being, the benefits of which accrue directly to the employer. The problem of

motivation from a management point of view becomes one of wisely leading and assisting rather than ordering. The efforts of both employer and employee, seen from the Japanese perspective at least, meld together to form a kind of harmony of many complementary tensions from which emerges a formidable competitor, indeed. As history has repeatedly shown, free men, working together in that kind of harmonious balance, are not so easily trodden under foot. Nor, for that matter, are they ever far from the heart of the battle.

There are, of course, objections to changing a philosophy and the way of doing things it drives. Problems inherent in bringing personal as opposed to institutional computing into a company are immediately raised by experienced voices from many different rooms. Their arguments, taken at face value, seem sound considerations which have arisen from a careful examination of both sides of the computerization coin. The conclusions seem to flow naturally from the laundry list of the problems involved in actually doing the thing.

But in the real world, the purpose of the statement of a problem is not always to bring the problem(s) to light so that a solution can be found. As often as not, a statement of problems created by change is really a defense of someone's turf; a carefully concealed objection to change bred out of fear of losing gains fought for and won over a period of time. The reasonableness of the objection(s) gains additional strength from the style of presentation. When several voices are orchestrated in the objection(s)—each adding dimensions related to the protection of their own turf—the weight of the combined argument makes it difficult to move out of the way.

In point of fact, the concept of turf may be the most difficult and complex issue to resolve within the larger issue of how a company is to computerize. Turf, after all, is the fundamental benchmark of how well a manager is doing, a badge to be worn in public which carries the Announcement Of Achievement, of upward mobility, of how much progress has been made toward the achievement of goals. Turf is the common measuring rod of accomplishment, of victory over competitors. The man who owns the most turf is the best man. Any change which would affect the size or shape—or concept—of turf is immediately examined on the most personal level. To most, change in the size of turf means nothing less than a

What will happen to people who aren't quite as "good" with computers as others?

demotion, a clear signal from management that the time has come to polish up the resume, to pick up the telephone and put out the word that one is interested in becoming interested somewhere else. To provide the citizens of a particular turf with the means to increase their involvement in production—and by extension in the company—beyond the limits imposed by their place in the turf, is a fundamental change in the concept itself. It reeks, at least to some, of anarchy, of loss of ability to rule and through loss of rule, loss of ways and means to produce.

Perhaps the second most difficult obstacle to be overcome, and the one most directly and organically related to the larger concept of turf, is fear of exposure. A slice of the corporate turf provides a hiding place not only for individuals, but for departments as well. There are as many places to become invisible, and ways of doing it, as the size and style of the workplace provide. No judgement can be made on a department's performance if that performance can't be readily seen. That's equally important to producers and managers who realize early on that the opportunity to produce effectively has been designed away from them. Their lone option is to meet unit output expectations in a way in which that output has minimum exposure to those who are in a position to demand more of the producers and managers than the design of their collective job will allow them to do.

A significant percentage of the producer force is at least as smart as the people who manage them. No management is possible, they know, if no production occurs. In that case, as management well knows, it will itself be replaced. Since the goal of both is to survive, and since one can't survive without the other, a kind of symbiotic relationship springs up and is immediately institutionalized for the greater good. The pact is simplicity itself: The manager agrees to protect the common turf from invasion, from break up, from internal revolt, from the ridiculous demands of young Turks not old enough or experienced enough to understand the rules. In return, producers agree to produce enough work to meet department quotas, on schedule; the net result of which is to keep their management at a performance level which guarantees them transparency, safety, and of course, survival. But the deeper pact between producers and managers is that no one citizen of their shared turf be allowed to perform at a level which would call attention to the group. Personal computing implies a way in which that

rule can—and most certainly will—be broken. Institutional computing, on the other hand, promises that the status quo will continue to exist. From that perspective the choice of the way in which to computerize a company is relatively simple.

It is on the agreement of limitation of performance to the lowest common denominator (and one that is generally considerably lower than the design limitations would infer), as a collective strategy to protect the group that the third component in the argument against personal computing arises—simple personal fear. For if one producer in the department is given the opportunity to lift his or her performance above the limits agreed on by the group, the performance of every member of the group will be called into question and re-evaluated against a new standard. Expectations by management will change. Old agreements with department heads will be voided as managers struggle with the new set of expectations handed down to them by their own superiors. Department interrelationships will change, the pecking order will be shaken out and individual self-evaluation based on the standard of the lowest common denominator will be invalidated. Job security, based on the internal laws of the turf, will be at an end as new discoveries are made about the power of personal computing. Who will *really* be needed in a department when by the introduction of a single unfettered computer, several jobs can be accomplished in a shorter period of time than several people took to do the same job the old way? If everyone in the department is given the opportunity to personally compute, to find ways of doing things which will help them become more efficient, more productive and more valuable as an employee, it is guaranteed in the common perception that someone will break the rule of the lowest common denominator and do just that. In the old way, that rule was enforced on its most basic level by limitations designed into the tools and the agreement with management. But if the tools have no such limitations, and management changes its perception of what is possible based on a new performance by one person within the department, what will happen to those who aren't quite as "good" with computers as others? To individuals, the question is negatively reduced to its most intensely personal level. The easiest answer is to get on with protecting the turf.

But turf, and its principles and ways of doing things, will not surface

No technical obstacle exists which would impede the successful introduction of computing in any company.

directly in any argument against personal computing although it will be a major driver in the debate. The argument against personal computing is, at least at this writing, generally cloaked in the presentation of the technical difficulties involved in doing the thing. How will units of production be measured? How will data be shared if everyone is allowed to choose different tools with which to do their job? What protection will there be for sensitive data? What happens if a key employee leaves and no one in his department understands the hardware or software he was using to accomplish his task? What kind of measures can be taken to guard against loss of data in the case of a massive power shortage? How will records be managed? How will the equipment be maintained? Does personal computing mean that the advantage is given to that employee bent on industrial espionage of one kind or another? How will management be trained to manage people who are personally computing? What proof is there that allowing employees access to personal computers will motivate them in the first place? And finally, what proof is there that personal computing as a production methodology is any better a way to improve quality of product—and insure better reception in the marketplace—than institutional computing?

The simple fact of the matter is that no technical obstacle now exists which would seriously impede the successful introduction of personal computing into any size workplace. Data can be accessed by telephone and once accessed, shared. Password protection can be easily placed on sensitive files and in a variety of ways. The loss of a key employee means only that someone else will take the data on which that employee was working, input it into their machine, and continue the job at hand. Power shortages can be handled through surge suppressors and in-house electrical generators which are keyed to take over electrical supply in the event the power drops beyond a set level. Data-base management software now exists of a size and power which makes it difficult to imagine a job too big—or too small—to be handled successfully. The job of training managers is longer and more complex, but possible—unless those managers are dead above the shoulders.

Ultimately, most arguments against the introduction and use of personal computing in the workplace center in some way on the method by which individual productivity would be measured, and whether or not personal computing really will provide a motivational thrust for the producer. It is central to the argument which is at the heart of the objection of the turf dweller.

The problem of measuring producer output is a misstatement because there is no problem in measuring actual output. The real problem is one of setting standards of production in the first place. The production limits of one experienced personal computer user change as he builds up a history of understanding of the power the computer gives him. Indeed, no minimum limits are really possible since even the slowest of producers will be propelled by the tools with which he is working. A day or a week or a year or a century of producer output can be reduced by a computer into units of measure. The machine can then quantify—and in the doing, analyze the quantification according to predetermined parameters—in the relative blink of an eye. But knowing how much one person is capable of producing when using a personal computer is the real question, and it is simply too early to really know.

The trigger mechanism which fires motivation in personal computing is neither hard to discover nor, once uncovered, hard to understand. Personal computing is simply the doorway to the frontier of a new universe, awaiting exploration which *can be done by any individual willing to invest the time to learn the combination to that doorway.* The act of personal computing is the process of discovering the potential within that universe. The generation of excitement and motivation in people who personally compute comes from the discovery that the untapped universe they are discovering lies within themselves, *not within the machine!*

The sudden epiphany of discovery surprises and for a few moments, is enough to satisfy the personal computer user. But very quickly a question presents itself: If I can do that with this machine, what else can I do? And the personal exploration for answers to that question is, from this early perspective, limitless. Motivation to find answers to that question acts as a propellant of the kind which adds new dimension to the word motivation.

There are few desires stronger in human beings than the desire to create, and society honors its creators in every field. But it is generally believed that only a few possess the ability to create, only a few possess some unique process which allows them to see things and say things and

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add things up in a way that provides us all with fresh thought, new perceptions, and meanings in complex interrelationships which have not been seen or thought of before. But there is virtually nothing which can be put down on paper that is not amenable in some way to the if-then power of the computer, and at its most primitive, creativity has its beginnings in the examination of if-then constructions; if I do this, that will occur. If I change this, that will not occur. Given the manipulative speed of personal computers, an answer to questions, to ponderings, to wonderings is possible in situations that made those same answers prohibitively expensive or time consuming for the average person to pursue in the past. What quickly becomes apparent to even the beginning user of personal computers is that he has been armed with a tool which will give him the power to create. At that point, another dimension in personal motivation is added which is difficult to measure.

The process works exactly the same way in the workplace. Since there is nothing currently put on paper which cannot be attacked and improved upon by seeing it in the new way made possible by personal computers, the producer is suddenly armed with ways to prove, disprove or improve ideas, methodologies, conclusions. Moreover, personal computing clarifies problems and allows the producer to view them from several different perspectives almost simultaneously. Personal computing allows a producer to gamble on a hunch because nothing is really risked when the hunch is later played out in simulation on a CRT screen. The results of any modification to an idea or design or methodology can be fed back almost instantly to whole groups of people who have come together through telecomputing to witness those results. And depending on the results, the if-then game begins again: Yes, the modification is good...but if we did this, would it be excellent? What if we didn't change this, but rather, changed that? What would happen then?

The issue of whether or not to unharness the power in computing in the workplace, and in the doing, remove the fetters from the only group of people who can make a difference in the reception of products by consumers, has implications well beyond the scope of the corporate battlefield. The personal vs. institutional argument signals the beginning of the battle for the shape and dimension of our future. We can, as a nation, choose to prolong the life of the Industrial Age, laying blame on clever outsiders for the downward spiral of our collective strength. We can continue to pay lip service to the concept of the development of a New Economy, while at the same time clinging like drowning men to an age which has seen the surface of the waters of change for the third time. We can resist change, modifying the new technology in such a way that it causes no change whatever, and chance the consequences.

We can, of course, make a different kind of choice, one that will treat the power of personal computers in the same way we as a nation treated the development of spacecraft. The craft themselves were marvelous inventions, but nothing in and of themselves. Their power lay in the fact that they could transport us to places where we had never been before, and through that transportation, open up vast new arenas of knowledge and understanding of the exterior world in which we live. Personal computers, in that perspective, are simply marvelous craft, but nothing in and of themselves. Their power lies in their ability to transport our minds to places where we have never been before, and through that transportation, open up vast new arenas of knowledge and understanding of the interior world in which we live.

GEMS OF WISDOM

Typing And Printing Text

My problem was not saving money. My problem was, and still is, that the Commodore Cartridge VIC-20 word processor is not available in San Antonio.

I am a retired construction and oil drilling engineer whose hobby is mathematical research and its applications to housing and oil drilling. This involves heavy computation, writing, and typing. It was an exhausting task, until the VIC-20 computer and the VIC-1525 graphic printer came to my rescue.

As I've said, I couldn't locate a word processor in San Antonio. Commodore has no 800 phone line to provide any help, either.

I found the instruction manual for the 1525 quite foggy, which is regrettable because it doesn't emphasize many of its good features. I discovered, however, that the VIC-20 and the VIC-1525 "are better than they have to be," and I was able to use their capabilities to produce many pages of text, without a word processor. I don't need to command each line to 'PRINT#',',' (COMMA) or type two quote marks for each line of text. I can type letters in both upper- and lowercase, all without a word processor.

I only need to enter the text with line numbers and a single quote mark in front of each line. Next, I enter the commands: 'OPEN3,4: CMD:LIST' and I get my hard copy pronto. For editing, I use the cursor.

The line numbers and the quote marks printed out on the side of the page are no problem for my type of work. But if I were typing a business letter, I would cut off the strip. I am trying to find a way to get hard copy without the numbers. Another advantage: I can run many hard copies by repeating only two commands (CMD3:LIST).

Leon H. Nissimov
SAN ANTONIO, TX

This Gem of Wisdom wins $25 for Leon Nissimov. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, *50 Essex St., Rochelle Park, NJ 07662*

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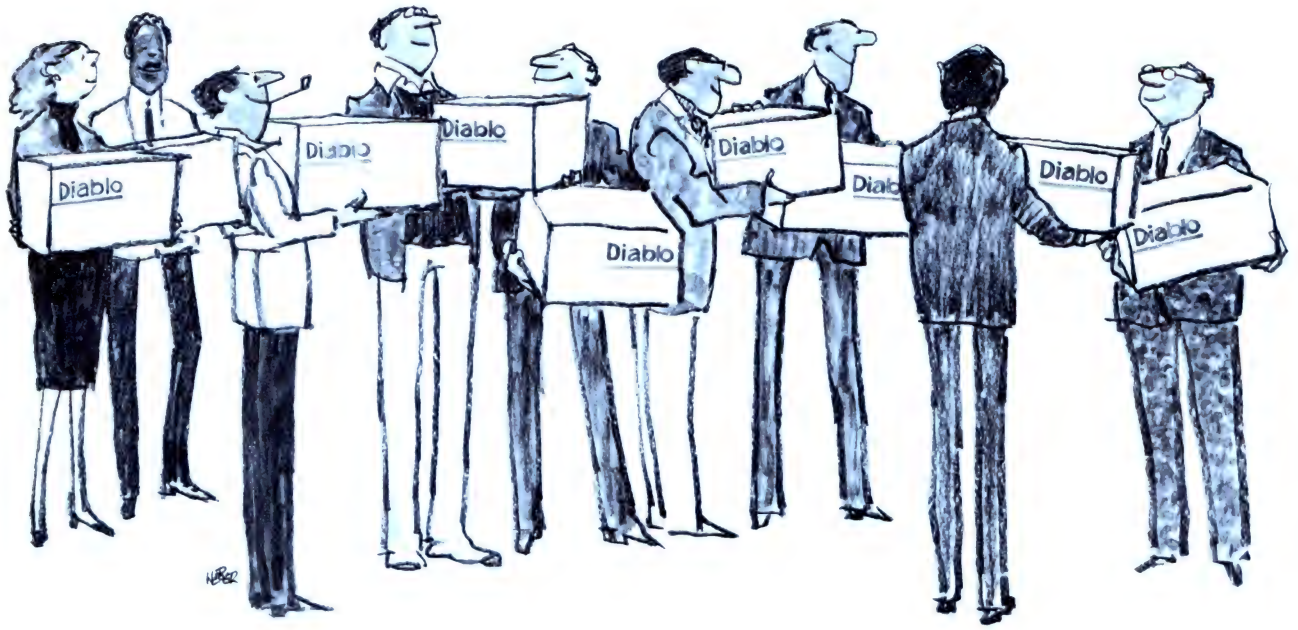

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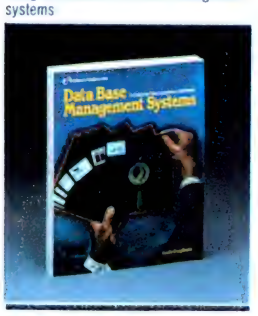

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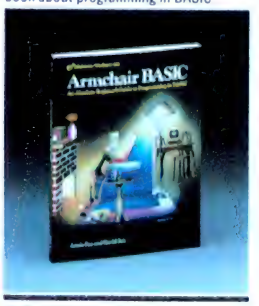

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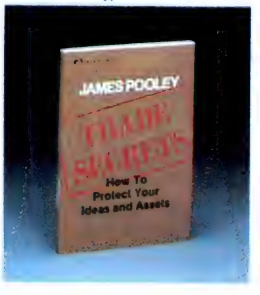

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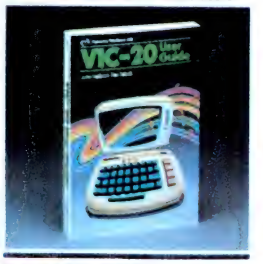

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American Education: The Dead End Of The 80s

When four out of five 17-year-olds can't write an essay, we're in deep trouble. The right use of personal computers may help us save our kids

by Arielle Emmett, Associate Editor

It was nearly impossible for me to reconcile the glowing reports by the Minnesota educator with the broader-based national statistics and commentary that had begun to litter my desk.

Dr. Susan Vaughan Kamla, a music education specialist for the Minnesota Department of Education, was speaking frankly, and at times, heatedly, about the value of computerized instruction for the 579,000 primary and secondary music students in her state.

The computer, she said, creates an "environment" for learning, and brings to each child the advantages of immediate feedback and reinforcement, self-paced instruction, and the potential for strengthening "concomitant" skills of reading and mathematics. Students' motivation and self-esteem, she reported, is boosted tremendously.

"A child's self-image is put on the line now with his or her ability to catch on to the computer," she asserted.

Vaughan Kamla has been working since 1979 to help coordinate the state's major effort in computerized instruction in music. She has seen more than 40 percent of the school districts adopt microcomputer instruction to teach music fundamentals, drill and practice, theory, and more, as part of an aggressive statewide computers-in-the-schools program which has resulted in the installation of more than 10,000 personal computers in Minnesota schools since 1978, with plans for even greater numbers in the next five years.

Photos by Werner Wolff/Black Star

Contemplation: Kenneth Hummiston's computer class, Ridgewood High School.

Yet, even as Vaughan Kamla spoke, there existed a stark and immediate contrast between her own state's decision to embrace the new technologies and to make them work toward higher educational standards (Minnesota reports better than national average scores, and a higher percentage of its high school graduates going on to college or post-secondary training)—and other voices expressing doubts as to what value these technologies might ultimately have for a nation that would seem to have lost sight of the value of learning itself.

Falling behind

Some of the strongest criticism is to be found in the damning report on America's educational incompetence, "A Nation At Risk: The Imperative For Educational Reform," by the National Commission on Excellence in Education. It is one of several such reports published this spring indicating that, on the whole, the American educational system is on a profound backslide: In the past two decades our nation's children have been failing to take the demanding courses needed to prepare them for a technologically oriented world. By 19 measures of academic achievement, according to the report, America's children suffer in comparison with those of other industrialized countries; their reading, computational, and "higher-order" skills such as logic and the ability to draw inferences have also declined rapidly—along with their scores on the S.A.T., science achievement scores, and other exams. One of the most shocking findings is that only one-fifth of our

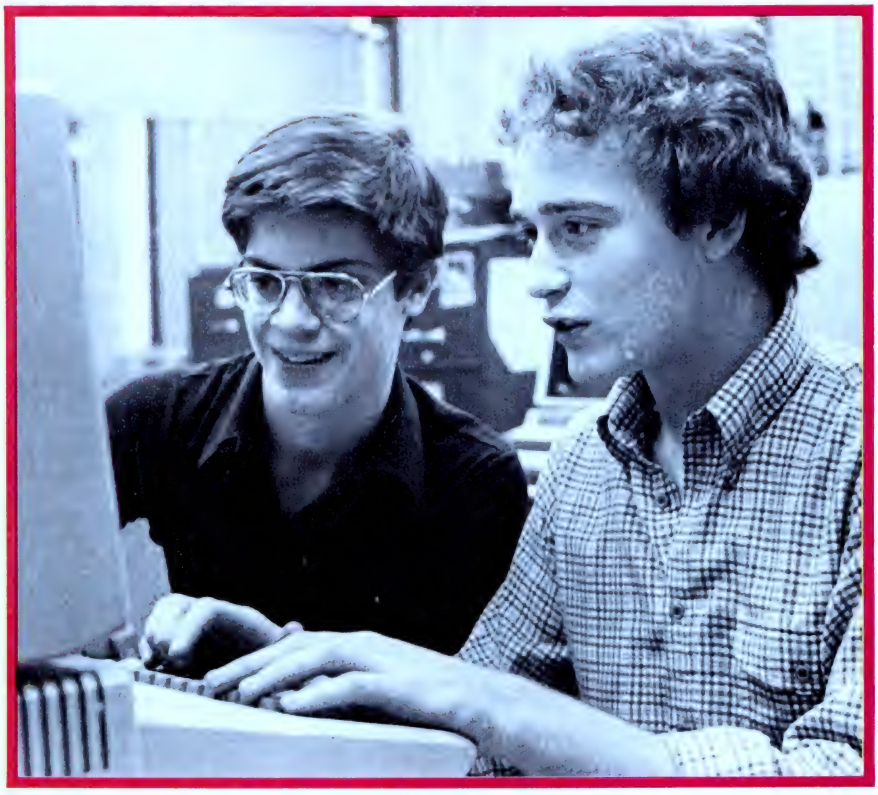
What, indeed, can a computer in the classroom do, or not do, for a child's mind?

17-year-olds can write a persuasive essay; only one-third can solve a mathematical problem requiring several steps; and 13 percent, by the simplest tests of reading, writing and comprehension, are functionally illiterate. (That figure may be as high as 40 percent among minority students.)

Where does technology fit into this dark picture? In a landscape of diversity and depressing inequities between one school district and another, one child and another, teachers, parents, and administrators are grappling now with the idea—and the action—of placing computers intelligently in the schools. At the same time, they are dealing with pressures, complaints, and reports such as the National Commission's, which suggest that perhaps we have mislaid what is really important: basic education, quality education. But what is "quality" and "basic" in an age as complex and technologically informed as ours?

Some teachers are openly critical of the Commission report, saying it doesn't adequately speak to the "high schools down the street" doing an excellent educational job despite the national trend, and managing the computer question on their own.

Other teachers, administrators, and officials seem willing to explore the tensions underscored by the report: What, indeed, would a computer in the classroom do, or not do, for a child's mind? Could it be yet another diversion? And what was the place of the new technologies among these diverse institutions, public and private, especially when many of them were having trouble coping with money shortages, a drop-off in the quality of teachers, erosion of parental confidence, and the plain old suspicion that maybe we were rushing these newfangled machines into the schools and not thinking enough about how they ought to be used? And maybe using them like bandaids, when the good old "three r's" were being left to rot in a closet?



Rich Veldraw (1) and Jim Olsen collaborate in a computer class at Ridgewood High.

There have been scattered complaints of this sort, and analyses of what ought to be done.

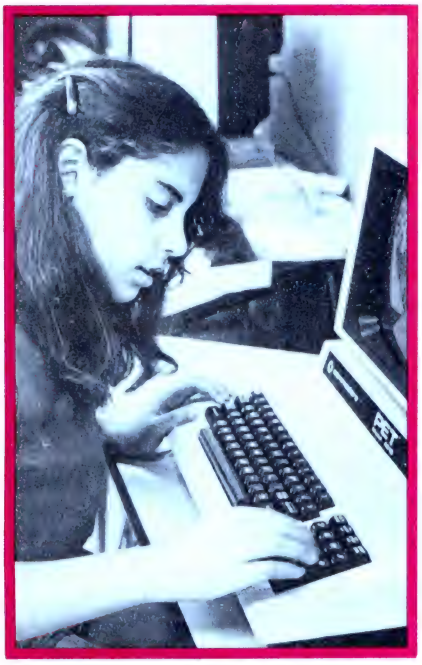
Overall, there seems to be a gap between the two.

Says Dr. David P. Gardner, chairman of the National Commission on Excellence in Education: "There's an authentic and growing awareness of the role computers will play in the lives of people and in the educational process. There's a significant incapacity on the part of the school system to know how to get from here to there, but a growing awareness of the need to do so."

One school administrator who asked not to be identified sees the problem this way: "There's a real urgency. There's pressure," he says. "And there's some legitimate concern on the part of parents that we've fallen behind technologically and should catch up."

A recent article in the *Wall Street Journal* pointed to the extent of the problem, showing, for example, that even with a $2.1 million investment in hardware, Broward County, Fla. schools were underutilizing their 900 Apple II computers because of a lack of instructors and instruction time for teachers, as well as the failure to allocate money for appropriate software. According to the article, other school districts around the country are facing similar difficulties, even though the national investment in hardware, software, and adjunct training has reached an estimated $150 to $200 million a year. The article, citing a New Jersey educator, reads as follows:

"Under pressure from parents and school board members to begin computer instruction, 'schools are behaving in exactly the wrong way,' contends Phillip Mackey, an official of the School Boards Association in New Jersey, a state where many local



Tanya Ghaleb, a Ridgewood sixth grader, writes a computer program.

districts have invested heavily in computers. 'First they buy the machines. Then they buy the software,' Mr. Mackey says. Then they start to think, 'Why did we get into this in the first place?'"

Dr. William Brosnan, principal of Northport Junior High School in Long Island, N.Y., and chairman of a computer planning committee for his district, which recently presented for vote the first phase of a proposal calling for $600,000 over a 6-year period to establish a program of personal-computer-based learning in the schools, says a chief concern was "getting moving on the program" as rapidly as possible. Another concern, he says, was allaying some teachers' fears that the computers would be "another case of technology gathering dust in a corner."

Marilyn Spencer, coordinator of computer instruction in the Ridgewood, N.J. school system, has been running a nationally recognized program there since 1965, and expresses the situation worriedly and thoughtfully. She's heard from a respected expert that many schools around the country are "decorating the curriculum with computers, not restructuring it." That expert is Dr. Mitchell E. Batoff, president of the Institute for Professional Development, a nonprofit educational research group based in Princeton, N.J., and director of CE '83, the Computers in Education conference held this summer at Rutgers University. He could explain all about this "jumping on the bandwagon" business, Spencer said.

Warnings

Dr. Mitchell Batoff is one of the most vocal critics of computer misuse in the schools, and he reports a strong "disenchantment" with most computer assisted instruction (CAI) programs. These are software programs

TAKING DIRECTION FROM THE NATIONAL REPORT

In August 1981 Secretary of Education T.H. Bell, responding to widespread public concern that something had gone wrong with America's educational system, created the National Commission on Excellence in Education, a panel of educators drawn from top universities and public schools around the country. The panel's responsibility: to investigate the quality of teaching and learning in America, hold public hearings, and report its findings within 18 months.

The resulting report, A Nation at Risk: The Imperative for Educational Reform, *was widely publicized and discussed. It argued that American education was being eroded at its foundations "by a rising tide of mediocrity" that had manifested itself in diffuse and watered down high school courses, many of them "general track" courses, rather than college preparatory or vocational; lower academic standards for teachers and students, declining standardized test results, grade inflation, and a spate of remedial college courses. The study also found critical shortages of qualified math, science, and language teachers in some states as well as lower-quality textbooks which had been "written down" by publishers over the last decade in response to perceived marketing needs.*

To remedy these deficiencies, the report called for a stringent raising of academic standards, both in public schools and in colleges; more time spent in schools and on homework; 11-month contracts for teachers and higher pay that is performance-based; and significantly, the implementation of five "New Basics" in secondary school, which include four years of English, three years each of mathematics, science, and social studies, a half-year of computer science, in addition to a "strongly recommended" two years of a foreign language for the college-bound.

Personal Computing *asked several experts, from the U.S. Department of Education and the National Commission itself, to clarify and comment on the report—and on what role computers may have in education as the nation regirds itself, looks for money, and adapts to information technology as a learning tool:*

Dr. Glenn T. Seaborg, member of the National Commission on Excellence in Education. Former chairman of the Atomic Energy Commission and recipient of the Nobel Prize in Chemistry in 1951, Dr. Seaborg currently holds dual positions as University Professor of Chemistry and Associate Director of the Lawrence Berkeley Lab, University of California, Berkeley. Seaborg was also author of the notable recommendation "D5" of the National Commission Report, which called for the immediate hiring of qualified non-school personnel to help remedy the shortage of math and science teachers around the United States. He has been very involved in a number of teacher retraining projects using microcomput-

It takes 200 to 300 hours of development to come up with a useful program.

which use the computer as a medium to teach primarily non-computer subject matter. In CAI, a computer may be used to present material in a tutorial format, the better ones guiding the student through the material, setting the pace to suit the student, prompting, cueing, asking questions, and presenting relationships—much of the time in a strict alternative or multiple-choice mode. (These differ from the newer "discovery-based" programs, which use the language Logo, for example, to help students discover mathematical or qualitative relationships.)

Other CAI programs may offer an "electronic flash card" drill and practice format, which can be used to develop skills with or without the teacher present.

The problem with many CAI programs, Batoff argues, is that they are often badly put together or utilized in the classroom as audiovisual aids, with no thought given to context, or to integrating them into the curriculum. That can result, he says, in close to zero learning.

"Quite frankly," Batoff says, "I think what's going on in many places around the country is a mishmash of aimless activity which does not reflect the very significant uses of the microcomputer in the real world of business, industry, science, technology, and the arts." Batoff sees the real-world applications of computers and microprocessors as a "pervasive and profound influence" which ought to be addressed by teaching students useful and legitimate computer skills: word processing (which he believes should begin in the third or fourth grade); data-base management; electronic spreadsheeting; problem solving and analysis; laboratory simulations (which teach real lab skills, he emphasizes, not just making the laboratory "interesting"); some programming, and computer graphics for art and music. These applications, he asserts, are all outside the realm of CAI, and can be taught through effective hands-on computer literacy courses of the type designed by Arthur Luehrmann, founding partner of Computer Literacy, a small, California-based company pioneering in this field.

"This takes money and machines," Batoff says. "Schools need this direction . . . there are too many cute little programs with Commodore PETs out there." Teachers are being deluged by hundreds of vendors and software manufacturers pushing their products without the adequate research or investment in time to make them work.

It takes 200 to 300 hours of development time to come up with a useful program, he says. "And I don't think that investment is being made in microware."

ers at the Lawrence Hall of Science.

Dr. Seaborg, have we (as a nation) fallen behind scientifically and technologically?

Seaborg: The population as a whole is behind. The scientists themselves are as well educated as ever, and some students are continuing to go into science, but the population as a whole is not adequately educated in science.

Why did this happen? Is anyone responsible?

Seaborg: I think we are all to blame. The students in the 1960s demanded courses that were more "relevant," but they defined relevance incorrectly. They thought "relevance" had to do with life adjustment, whereas it is more related to strictly academic courses in science, mathematics, English, and social studies.

In light of changes going on in curriculum today, especially the new emphasis on technology in the classroom, what should students be learning with computers?

Seaborg: I think that students should understand the computer, to have a little bit of background in what digital computing means. They should learn some simple programming, and actually be able to use it in their work—in mathematics, for example. They should understand a little bit about electronics, know the terms and basic ideas. They shouldn't be afraid of words like "electron."

Computing knowledge will be an absolute necessity in the next 25 years. Students will need some underlying knowledge of what is making the computer function—not simply how to operate it with available programs.

What about the federal role in implementing technology? Have you been satisfied with the Administration's reactions to the Commission report?

Seaborg: As far as the federal government is concerned, the President is opposed to federal aid or funding for local school districts. Perhaps too much so. I can't predict in what direction it will go. But there are bills now in Congress that would provide aid (in the form of grants) for precollege science and mathematics students (among other provisions such as in-service training for teachers of math and science). I doubt very much President Reagan will exercise a veto.

Are there any other considerations?

Seaborg: I'd certainly have the federal government support teacher training, provide students with financial assistance; continue to support research and graduate training, and collect data on students and curriculum development. Whether the federal government can infuse massive funds (for technology) . . . it's too early to tell.

At the Lawrence Hall of Science at Berkeley, we're strongly concerned with curriculum development and teacher training on microcomputers. We have about 125 donated by various companies. A number of science centers have begun to train and retrain teachers this way and they are trying to get funding, mostly private.

What will be the impact of the Commission Report?

Seaborg: There will be a ground swell, but it will be spotty. There will perhaps be greater disparities than we had be-

Preparation: Ridgewood reports higher S.A.T.s than the national average.

There are, of course, notable exceptions, Batoff concedes. The software developed through the Minnesota Educational Computing Consortium (MECC), a state organization established in 1978 as part of Minnesota's computer education plan, is highly respected and used by many teachers throughout the country; other software research going on in university centers may yield fruitful results.

Creating the courseware

But as some indication of the problem, one might easily look at a recent joint evaluation project done by Education Products Information Exchange, a non-profit organization in Watermill, N.Y., and Consumers Union. As cited in the *Wall Street Journal,* 300 teachers in this project evaluating an early batch of CAI programs for the classroom as well as other types of software (including "discovery-based software," simulations, and "computer-managed instruction"—programs which involve the computer in an administrative function only, i.e., scoring tests, interpreting results, managing student records, etc.), found that "of the initial 50 reviewed, only a quarter scored 60 percent or better. Many of the drill and practice programs failed, for instance, because they allow users to 'guess their way through,'" according to Kenneth Komoski, the Exchange's executive director. But Komoski adds that many of the more recent programs are faring better in the evaluations. "You're apt to have better quality," he says. "These newer programs are attempting to exploit the potential of the computer" in terms of graphics and interacting capabilities, more so than the traditional electronic flashcard approach.

Indeed, interviews with software

fore. Some districts will raise taxes commensurately so (higher academic standards) will be possible. Other people will continue to have low taxes and an illiterate population.

Donald Senese is Assistant Secretary for Educational Research & Improvement, U.S. Department of Education. Dr. Arthur Melmed, Director, Education Technology and Science Staff, works within Dr. Senese's office. Both men are experts on the federal role in the implementation of information technology in education.

Dr. Senese, is there a national policy being formulated as a result of the National Commission report?

Senese: In June 1982 Secretary Bell announced a technology initiative in the Department of Education which was to encourage states and localities to look at uses of technology to improve education. . . .We'd support programs through the U.S. Department of Education to bring this about. Again, we see our role as sort of a limited one focusing on assisting states and localities to realize the potential of technology . . . to exchange information and utilize that to upgrade educational efforts.

Is there an urgency to do this?

Senese: Certainly the National Commission Report shows we are in a difficult situation as far as the educational system goes. The focus (was) on rising mediocrity without teaching the basic courses very well; plus we're not meeting some of the new challenges.

What can be done? And what degree of computer literacy do we think students should have?

Senese: The Report defines the five basics. I think it's difficult, though, to define exactly what we mean by 'computer literacy' except that students should be familiar with the computer, how it can be utilized in the classroom, how it can assist them in the job market and in the learning process. I think the important thing to make sure is that our students are well educated in the basics of reading, writing, arithmetic, and so on, and then (they should go) on to some of the other skills they can utilize to improve their learning.

Does technology then assume a second place as compared with the basics of reading, writing, and math? We're referring both to funding priorities and also to the amount of time the Administration will spend trying to get technology into the schools?

Senese: I hate to put it in a secondary position. It's very closely tied together. Unless you have students acquainted with the basics you will not be able to master the higher skills . . . .

(As to priorities), what we are not planning to do is put money into hardware and software but we are planning to assist the schools in getting involved in this technology revolution—to show them how to use technology to improve student learning and teacher productivity and to make more effective schools.

But how? What kind of money is going to be spent to bring this about?

Senese: I think it's a mistake to assume it's money alone. I think one of the emphases of the report is a call for responsibility and action by state and local officials as well as parents and school boards. I think as far as empha-

In a world of fly-by-night software producers, special care is more the exception than the rule.

manufacturers suggest that a number of them, at least, are testing their products more carefully before releasing them into the schools. Among them is the Tandy Corporation, a prime force in both educational hardware and software sales, which has risen to the number one spot in a number of states. According to one spokesman, the company offers "aggressive discounts" to schools—up to 20 percent on the Radio Shack TRS-80 models, for example. "It's not just selling a bunch of hardware," cautions Ronald G. Stegall, Tandy's vice president of computer marketing. "It's the courseware." He says the company has been working with the producers to ensure quality control. Tandy has signed 30 cooperative agreements with educational publishers to produce software that integrates into the curriculum; and extensive free teacher training has, in the last year, sent more than 125,000 teachers through Radio Shack literacy courses. All the classroom products, he adds, are tested before they are released.

Researching CAI

Still, in a world of fly-by-night software producers, this kind of care would seem more the exception than the rule. And, Batoff continues, much of the research for personal-computer-based learning is actually based on minicomputers or time-sharing. "I don't think you can extrapolate from minicomputers to micros," he claims. He says there is "no comparison" between the software and how it is being used in a classroom setting. Early researchers, he asserts, spent long hours producing well-thought-out instructional programs for minis; this care has not been taken with personal computer spin-offs. Batoff thus concludes most research on CAI is "wishy-washy" since "there's been very little research done on the basis of microcomputers."

Some experts might argue vigorously with Batoff's premises. In fact, recent evaluations of CAI made by the U.S. Office of Technology Assessment (OTA), the analytical arm of the U.S. Congress, affirmed its effectiveness (see "My Computer, My Teacher"; *Personal Computing*, June 1983) and relative economy—an argument vigorously taken up by manufacturers who have made claims that personal computer instruction may cost as little as 30 cents per student hour, compared with $1.50 to $2 dollars for time-sharing systems, and $2 per student hour of conventional classroom instruction.

Still other evaluations, made at the Center for Research and Learning at the University of Michigan and the Educational Testing Service (ETS) in New Jersey, have indicated effec-

sis on the federal level, we have some specific programs we've been working on. For example, through the National Diffusion Network which identifies exemplary programs, we've been emphasizing programs in science, math, and technology. We've also identified five schools . . . "lighthouse" schools which are outstanding examples of how schools have utilized technology. We have provided a limited amount of funding for these schools to bring in people and explore processes and to bring these lessons back to their own school area. I think this is a more effective means than if we were to start a massive categorical aid program.

Are there any other projects?

Senese: A second project this year is funding a number of school-based demonstrations where schools will be challenged to identify certain learning objectives through technology, and how they could use technology effectively to bring about these objectives . . . . We are also focusing funds for research in new applications in technology, particularly how technology can assist us in crucial areas of improving student skills in science, math, reading, and writing . . . .

Dr. Melmed, how much is the federal government spending on secondary and primary education?

Melmed: Most of the dollars come from Chapter II, which is a formula grant program. It's alleged that states are using substantial amounts of that money, which totals about $450 million in this fiscal year, to buy equipment and software . . . There are also some federal discretionary monies . . . less than $10 million, spent on certain technology in the classroom projects.

So personal computing is definitely the direction computer-based instruction is taking in education. I think it's the natural and easy thing for schools to invest $1000 or $2000 in a stand-alone unit rather than investing in a 16- or 32-terminal unit. However more efficient it may be, it's nonetheless too large a capital investment for inexperienced schools to get into. I would say we will continue to see growth in small personal computers . . . It's probably not too far wrong to estimate that the total investment is somewhere between 150 million and 200 million a year.

But isn't that an enormous investment (for local and state) districts to handle, Dr. Senese?

Senese: It's a decision all governments must make—defining priorities.

. . . the federal government needs to avoid overstimulating investment in computers, which a major federal program could easily do.

Dr. Senese, are we behind other countries technologically?

Senese: My personal opinion as far as technology and computer development is that we are ahead or holding our own. The problem is going to be what happens in the next 10 or 20 or 30 years. The strength of the National Commission report is as Thomas Jefferson said, it's a "firebell in the night,"—it's warning us of future danger. If we take action now we may be able to avoid the more severe crisis in a few years coming. But there is a problem. There's no denying it.

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Children who may need the computer the most to learn may be the last ones exposed to it.

tive uses for both CAI and computer-managed instruction (CMI). (Much of this research is also based on minicomputer and time-sharing systems.)

But to the University of Michigan's James A. Kulik, who reviewed more than 300 such research projects for his own study (throwing out 250 of them because of "crippling methodological flaws"), the verdict for CAI is still positive:

"The effects of computer-based teaching seemed especially clear in studies of disadvantaged and low-aptitude students . . . whereas effects appeared to be much smaller in studies of talented students," he reported. Marjorie Ragosta, a research scientist for ETS who, between 1977 and 1980 evaluated the performance of several thousand children, found similar and dramatic gains in tested achievement among students from low-income homes eligible for federal assistance—data that would seem to support the continued development and research on CAI, and the expansion of CAI programs.

The irony of these studies, Batoff and others might well point out, is that the children who may need the computer the most to learn may be the last ones exposed to it. That is the harsh reality of a system of educational unequals, where state and local monies make up 92 percent of all school budgets (the federal government kicks in roughly 8 percent); where the current federal administration has, with few exceptions, adopted the role of highlighting, rather than bankrolling, outstanding educational efforts, and where local boards have primary responsibility in deciding where, exactly, the educational dollars go. In such a system, there is the ever-present danger, Batoff notes, "of the widening gulf between 'haves' and 'have nots'" of computerized instruction, a gap he says will only be remedied by large infusions of dollars.

Money, though, is not likely to fall from the sky. Until it does, Batoff will continue to question those who say a true revolution in classroom computing is at hand.

Is it a revolution?

"A microcomputer revolution?" he asks, with a note of skepticism in his voice. Do we want it? How, exactly do we want it? He argues that those who feel, in his words, "left out" ought not to feel that way, and should proceed with caution. Even with the profound increase in the number of personal computers in the schools—some federal officials are saying there may be as many as 300,000 currently, a number which may soar to 1.6 million by 1985, according to one independent estimate—"the equipment is still spread very thinly," he asserts. Of the 45 million precollege students in America today, less than five million were using computers in their schools between 1981 and 1982, and they were averaging only nine hours of computer access time per student per year, according to the National Center for Education Statistics and other sources. Some schools will eventually end up with one computer in a school. "One machine for a school is like one piece of toilet paper for a house," says Batoff, and he cites figures from the Educator's Unauthorized Microcomputer Survival Manual: "Even with a 50 percent annual increase in the number of microcomputers—assuming no change in the number of older terminals—by 1986 there will be only three computers per school, and one computer for every eight classrooms." "That is considerably less than a revolution," Batoff says.

But it is here—call it what you will—if not a revolution, then a pervasive phenomenon that has already seen its effects not only in primary and secondary schools, but at the university level as well. Some examples:

- In Ridgewood High School, where Marilyn Spencer created the first informal computer course in 1965 (processing her students' programs on a cumbersome IBM 1620 "load and go" system at Teachers College, Columbia University, where Spencer herself was enrolled) students now have progressed to a fully integrated program at the elementary through high school levels, which includes courses from basic literacy to advanced placement language courses in Pascal. (The Educational Testing Service in New Jersey added Pascal to its roster of AP exams this year.) Students in the 10 Ridgewood schools are using 97 microcomputers, as well as 25 terminals—part of a $121,000 investment the district has made in the last five years, with parent associations and even students kicking in thousands. The board of education has already approved $100,000 for computer education in 1983-1984, part of a proposal to spend over $325,000 in the next three to five years—a cost, suggests Bob Muller, a computer education specialist in the district, which seems warranted by the schools' performance. Ridgewood students score 50 to 60 points higher on their S.A.T.s than the national average, and 85 percent go on to college.
- In Asbury Park, N.J., an urban school district, supervisor of instruction Jack De Talvo is reporting "an increase in academic standards" since his school district, more than eight years ago, began to build its computer instructional base which now includes not only CAI math instruction for high school students, but a cooperative elementary program that brings children to a Bradley Beach Elementary School two to four times a week to teach them literacy, basic programming, and Logo.
- In the Northport-East Northport School District, a measure to allocate $65,000 for the first phase of the computer education program proposed by Dr. William Brosnan's committee met with voter approval by a margin of three to two.
- In Lincoln, Mass., teacher Margot Maddock of the Lincoln Public

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Computers, used well, may be significant components in solving our educational problems.

Schools is getting real "encouragement" from parents who like to see their kids take her programming courses, which she started in the schools five years ago. "We hadn't lined up a regular program for the sixth graders this year," she reports, "but so many parents asked for it that we started one." Maddock also conducts staff training sessions on the computer to help teachers overcome their anxieties. "There's a lot of interest," she says, "and a lot of caution. People want to use the computer wisely."

- Teachers and administrators around the country are forming round tables to talk about computing issues. In a recent report by *Electronic Learning*, Dennis Dempsey, principal of Wood River Junior High School in Hailey, Idaho, said he and other administrators had banded together to form the group, Computer Educators Idaho, to disseminate information, organize a public software library, conferences, and other activities. "All so we can get the state rolling and get the schools knowing what's going on."
- In Minnesota, Susan Vaughan Kamla's in-service training jaunts for teachers around the state are paying off. She predicts that as many as 60 percent of the school districts this year will use computers to teach theory and history; and in some "rural districts" the computer, she asserts, is "one of the most cost-effective means of doing it." Kamla's work is part of a high-technology effort in Minnesota education right now: At this writing the state legislature was considering two versions of a school improvement bill that would provide a blueprint for future computer education. Among the recommendations: $500,000 for courseware development, provisions for staff training, subsidies to schools for buying courseware, monies for buying unlimited duplication rights to software, and the like.

"Whole districts will be involved from preschool on up," says Dr. Gilbert Valdez, Minnesota's supervisor for curriculum development. "We're talking about something long-range." He says they hope to achieve a ratio of one computer to six students within eight years.

- At the University of Utah, notes former president David Gardner, "we've found the demand for computing time is exploding." The university ran a computing deficit this year of $200,000, he reports. Gardner says he hopes the Utah legislature will come up with further money.

Starting in 1985, Carnegie-Mellon University will require its students to buy specially designed IBM microcomputers as part of the entrance requirement. Smaller colleges and universities,—among them Clarkson College of Technology in Potsdam, N.Y., Stevens Institute of Technology in Hoboken, N.J., and Drexel University in Philadelphia—are also requiring the purchase of personal computers. Dr. Bernard Sagik, Drexel's vice president for academic affairs, welcomes the future with open arms, saying that freshmen and transfer students will be using 3000 newly designed Apple computers in the 1983-84 academic year. "It's the start of a campus-wide renewal," he says. "We're going to engage in a real dialogue about how we teach." Freshman word-processing skills, he predicts, will unlock clear thought. Dyslexics will have a better chance. Design students will revel in computer graphics. "It's not a quick fix," he says. The Drexel computing plan didn't happen overnight—the planning process took one and one-half years.

And yet, by any standard of history or time, all of this has happened overnight—all of it. Electronic learning, how to make "good sense of it" in Dr. Mitchell Batoff's words, how to comprehend the impact, when in every reasonable estimation it's in a stage no more advanced than Kitty Hawk—may just be too difficult. Perhaps we must blunder. We must toy with it, whatever its fashion: desultory, concentrated, spotty, brilliant, ill-thought-out—electronic learning, via arcade and tube and computer, is happening, and the processes of mind involved are as yet so poorly understood, so private and attractive, that one educator, Robert P. Weiss, in a recent editorial in *Electronic Learning*, concluded by calling it "the educational sex symbol of the 80s." The danger, he said, was in "being swept away.

"We need to keep our perspective," Weiss wrote, "about . . . computer literacy usage in the school setting . . . . What some of us are doing, in our infinite wisdom, is assuming that computer education (insert your own definition) is good for all kids. I think we ought to . . . look down the road a bit and design programs and curricula with balance and a recognition that we haven't as yet found much of any one thing that is good for *all* kids."

"We do need an educational balance," agrees Dr. David Gardner. "But we should not hold back what the computer can do for us with the concern that it will overwhelm us. We have to make sure it *doesn't* overwhelm us."

Whether or not that's possible remains to be seen. Thoughtful computer usage and understanding of what the blissful electronics can or can't do depends on work, on research, and on more sensitivity to a child's needs than perhaps we have, until now, comprehended. Understanding what makes a child learn better, and how, is crucial to any meaningful use of these machines. We simply don't know enough. And while remedying this is by no means an overnight task, it is certainly not the haphazard task many have taken it to be. Computers are not simply band - aids. Used well, they may be a significant component in solving our educational problems. But they are not the only component.

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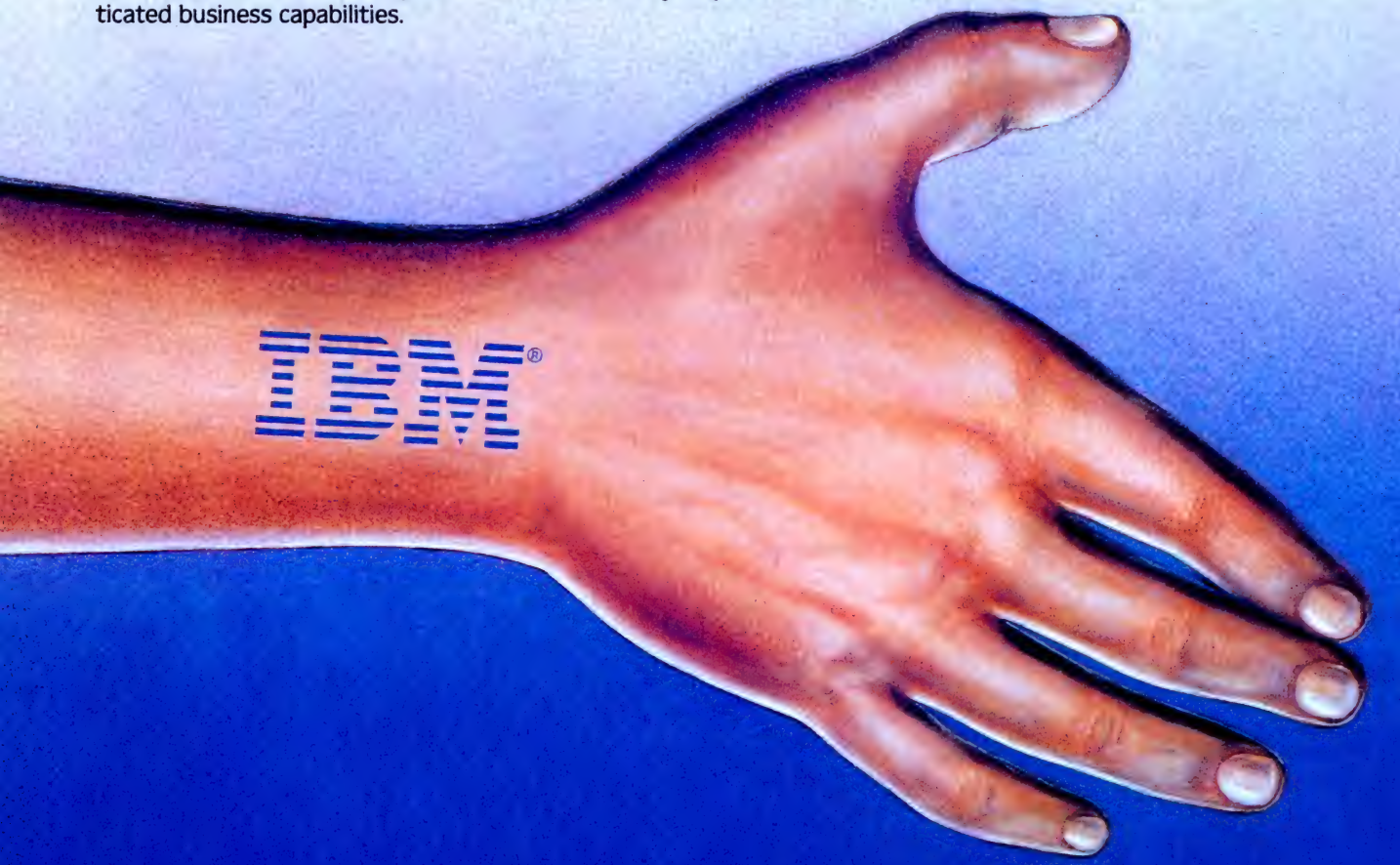

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CIRCLE 88

Learning The Hard Way

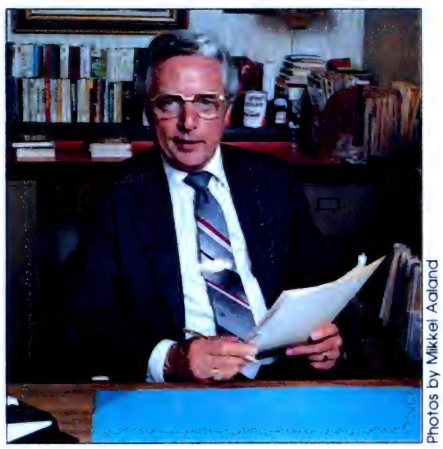
Sharing one man's hard-learned lessons can make computerization easier for you

by Diarmuid McGuire

Computerizing a small business has become a commonplace event in this country, as many Americans realize that the first answer to "What else can I do with my personal computer?" is: Make my business run more smoothly.

But along with all this activity have come occasional reports of difficulties on the front lines: of systems that don't work, of time wasted, of dollars lost. Bad news generally travels better than good news, and so these tales are repeated regularly. But what's really happening behind the scenes? *Personal Computing* examined the situation through the eyes of the user, dealer, software manufacturer, and hired consultant—in an attempt to answer two important questions: When computerization turns out to be difficult, where does the problem lie? And, more importantly, what can you do to avoid similar difficulties? The answer to both questions seems to lie in a fundamental decision which the computer buyer needs to make even before he signs his check.

It wasn't that Cliff Wells was incapable of understanding the difference between a file and a field. He was a noted expert on nutrition, and author of a newsletter with 10,000 subscribers. People listened to his twice-weekly radio show to learn about the biological mechanisms behind weight loss and the celebrated properties of lecithin. Mail-order sales of his Crest of Nature brand ginseng creme, pantothenic acid tablets, and more than a hundred other items were brisk enough to keep three employees busy. And his Palo Alto, Calif. office was methodically organized, from the boxes of Scriptmaster cards for the mailing list to the rows of shelves labeled with product code numbers.



Photos by Mikkel Aaland

Cliff Wells learned some hard lessons when he computerized his business.

The possibilities for small-computer applications, for everything from mailing list management to inventory control, were obvious. Wells recognized the opportunities, and moved into the world of computers. But within a matter of weeks, sitting with his newly installed computer system, Wells was helpless. He needed constant support. The machine that was supposed to solve his problems and give him more free time was creating new problems, and gobbling up time in the process. When his dealer's patience ran out after nearly 100 hours of hand holding, so did the usefulness of Wells's system, and the businessman felt he'd been burned.

The store owners

"The whole thing was a nightmare," Wells says. "They just didn't know what they were doing."

"They" were the people at Peninsula Computer, an outlet with a first-class reputation. The founding partners, Bill Bechtold and John Crews, had both been successful Silicon Valley executives. They had designed their retail venture for the business and professional market around a strategy that called for knowledgeable salespeople, quality products, good support, and prompt service.

Wells went to Peninsula Computer for two reasons: proximity and price. The Palo Alto store was only three blocks from his office, so support and service would be close at hand. And Peninsula's bid for his system was several thousand dollars less than the nearest competitor, a consultant, who

Diarmuid McGuire is a writer, Apple III owner, and software enthusiast.

"Every time he wanted to change something, he came back to us."

had made it clear he would charge for his time after the initial installation and training.

Wells purchased "the best hardware I could buy," and it looked good: a 256k Apple III, a Profile hard disk, and a letter-quality C. Itoh printer. Bechtold and Brad Pentowski, the Peninsula Computer salesman who handled the Crest of Nature account, reviewed the packages available to take on Wells's mailing list management, order tracking, inventory control, and cost of sales and profit reports, and recommended a data-base program called VersaForm. The program's publisher, Applied Software Technology, in Los Gatos, Calif., calls it a "business forms process."

Cookbook descriptions

VersaForm emulates almost any business form on the computer display. It allows the user to enter data into the computer forms and print them out on the same paper forms the business already uses, from invoices to income tax returns. It can handle calculations—the sales tax and the total amount of an order, for example—automatically. And the data entered onto the computer form goes into a data base from which VersaForm can generate just about any kind of report imaginable.

Someone has to design the forms (or input existing ones) and create the report formats, of course. But Joe Landau, founder, chief programmer, and president of Applied Software Technology, points out that a tutorial program, hefty instruction manual, and "cookbook" descriptions of how to set up some of the most common applications are free with the six-diskette VersaForm package. He feels the information he supplies is enough to let anyone capable of running a business learn how to set up a VersaForm-based business application. In addition, Applied Software Technology has a reputation for providing good support.

Part of Cliff Wells's agreement with Peninsula Computer, however, was that they would do this initial configuration, based on the forms Crest of Nature was already using. For Wells, this was an attractive part of the deal. But in the final analysis, it may not have been to his advantage.

One of VersaForm's most useful features was its look-up table, but it was also the cause of Wells's first problem. By referring to a look-up file, VersaForm can complete entries automatically on invoices, inventory lists, and other business forms. For example, when given the stock number, VersaForm can fill in the product description and price.

But the VersaForm look-up table is limited to 99 listings, and Crest of Nature's inventory had grown to about 125 items between the initial specification and the actual installation of his system. Wells wanted the table revised so that his 99 most common entries would be filled in automatically. But revising look-up data requires a working knowledge of the software—a knowledge Wells had never acquired, because the dealer had done the initial set-up work.

"We thought we would do the initial installation and let them take it from there," Peninsula Computer's Pentowski explains. "But Cliff didn't get involved. He turned it over to someone in his office. And every time he wanted to change something, he came back to us."

The look-up table change was the first of many such consultations, until Bechtold and Pentowski estimated they had spent 80 to 100 hours configuring, installing, and fiddling with Wells's Crest of Nature application. The sale had long since become unprofitable, Wells was becoming frustrated, and the relationship with Peninsula Computers was becoming strained. Suddenly, Cliff Wells found that the free support he'd been getting was no longer available.

Pentowski, meanwhile, vowed never to repeat the experience. "I'm a salesman, not a programmer," he said. "I'm staying away from data bases. If someone wants a unique business application, they have to pay for it."

The consultant

When Wells's next computer problem popped up, he called in Roger Brown, the consultant who had originally submitted the higher bid on the project. Since Brown was walking into the middle of a situation he hadn't created, it meant Wells had to write what was, in essence, a blank check for support. "I'm paying Brown $60 an hour to straighten out this mess," Wells observed. Brown would still be working for Crest of Nature four months later, setting up a system Wells could work with.

The crisis that sent Wells looking for Brown's help came when his clerical staff tried to add a few names to the mailing list and discovered they had run out of room. Wells didn't know how to expand the file space, so he brought in Brown. The consultant used a VersaForm utility to transfer all 10,000 records into a larger file extent, a process that took more than 12 hours. Meanwhile, the Crest of Nature newsletter mailing was delayed, and Wells lost additional dollars when he had to send his extra newsletter help home because they couldn't do their jobs.

Brown was not thoroughly familiar with VersaForm. If he had been, according to Joe Landau, he might have set up a temporary file for the new names. Then, in just a few minutes, VersaForm could have joined the two files into a sorted output file from which to print the mailing labels, and the mailing could have gone out without delay.

It's important to keep in mind, however, that VersaForm hadn't been Brown's idea, and he had little motivation to put the effort into making the program work. He considers VersaForm a good piece of software for some business applica-

Wells with a customer. He now realizes successful computerization depends on personal commitment as well as wise purchase decisions.

tions, but had he been involved with Wells's situation from the outset, he would not have recommended the program. (The lesson here seems to be that when you bring in a consultant in the middle of a situation, and ask him to make things right, he isn't necessarily bound to work with whatever software and hardware you've already purchased.)

Wells knew things weren't working out with VersaForm, but he didn't know exactly why. When the expert proposed a change, Wells wasn't happy that much of the work already done would go to waste, but because of his unfamiliarity with the package, he was unable to argue that VersaForm may have been capable of handling the application. The expert reinforced his gut feeling that it was time to try something new.

Wells was fortunate in finding a thoroughly knowledgeable consultant. Roger Brown had been involved with computers for more than 20 years, and in addition to working with small businesses, his firm writes contract software for some fairly large Silicon Valley manufacturers. His perspective on Cliff Wells's problem is simple. "If I were to tell Cliff what went wrong," Brown says, "the first thing I'd say is that he's an illiterate in the computer field. And this happens every day, to hundreds of small business owners."

Had Brown configured Wells's system initially, he would have diverged considerably from the equipment Wells was sold. Instead of a letter-quality printer, he would have chosen a faster, dot-matrix version, since Wells mainly uses it to address thousands of mailing labels each month. While the Apple III is not Brown's favorite computer, he admits that it was suitable for Well's needs. But in the area of software, Brown would have probably moved more in the direction of custom programming, simply because his perception was that Wells needed something set up precisely for his own application. Called in after the fact, Brown ended up adding $400 worth of hardware, $700 worth of off-the-shelf software, and $2000 worth of custom software to Wells's initial investment.

Could Wells have straightened out his own problems, given the configuration of hardware and software he was sold? "I don't think so," Brown says. "Not that he's not a very bright guy. But he didn't have the desire to know, and without that, you're never going to know."

Clearly, the services of someone like Brown are not cheap. Are they always necessary? "Often," says Brown, "the small businessman sees an ad that the computer store has for 20 percent off this complete system, software and all. And for perhaps 90 percent of small businesses, that will work, right off the shelf. But most guys don't know much about computers, and many of them don't want to—they want something that's as easy to use as a calculator. They don't want to find functions like Install, buzzwords they've never heard of, or a large vocabulary that baffles them.

"The 40-year-old businessman 30 years from now won't have this problem. At ten years old, they're learning all this stuff in school. But right now," says Brown, "there's a real, real problem."

And that's where consultants like Brown come in. "People come to me and I ask them what they want. If they say, 'I want the computer to bake cakes,' I say fine. We can do that, all we have to do is figure out how to hook it to the oven." Brown will satisfy the need, neatly and without fuss. It's instructive, however, to note that, according to Brown, few of his customers end up being self-sufficient computer users. "Unfortunately," he says. "But there's a

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Many dealers find a middle ground for support by offering classes.

turnover in personnel, say, and we have to go and train someone new. We try to create some unique documentation, so it's available, but we still have to go in and spend some time."

Brown hasn't had to visit Cliff Wells's installation recently. Things seem to be going pretty well now with the Crest of Nature computer system. "We have updated all of our files and can send orders every day," a new employee reports. And even though it was costly, Wells feels he came up with the right solution when he hired a consultant. He warns others not to repeat his mistake.

"Don't buy a computer unless you find a qualified person to do the software for you," he says. His opinion, however, is clearly colored by his own unfortunate experience. It's worth looking a bit deeper into whether such an absolute is accurate.

Dealer training

A consultant may be a good solution for those who don't mind spending the money and trusting someone else's judgement. But it certainly wasn't what Wells had bargained for—and in part, his perception of the computer system, and his expectations, seemed to be at the heart of the problem.

Wells had assumed that whatever assembly and maintenance of his system was needed would be handled by his dealer. And, in fact, Peninsula Computer did shoulder a good deal of the burden, although it wasn't really their job. Computer retailers mark up their products and sell them at a profit, just as grocers do. Yes, a good dealer will help train you and honor your warranties, but he can't come to your house and cook your meals. There's simply not enough margin in the sale.

It's a difficult dilemma for the dealer to get around, and one the customer should recognize at the outset. Many dealers find a middle ground for customer support—somewhere between "I can't help you" and endless hand holding—by teaching classes in how to use various software tool kits. There are classes devoted to VersaForm, for example, although not as many as VersaForm's publisher, Joe Landau, would like. But he thinks the existing VersaForm documentation is sufficent for most business people, especially if they already have an established work flow and business forms to emulate. And he's convinced it's best for users to configure their own VersaForm applications.

"If you get a lot of help from a dealer during the installation, and don't design or input your own forms, then it's going to seem like a bit of magic," Landau says. "Later, when it comes time to make a change, you won't know the magic words."

Landau notes that consultants have begun to specialize in VersaForm systems for specific applications. (Consultants who work with existing software, by the way, may be less expensive than consultants like Brown, who offer more expertise in creating their own software.) "One guy has done several landfill management applications, for example," he says, "including a program that links a truck scale directly into an Apple to calculate dumping charges. But a vast majority of our users don't need a consultant."

Support or no support?

An early, honest appraisal of your own interest in the computer is an important first step in deciding whether you need a consultant. As Roger Brown notes, off-the-shelf hardware and software is very often adequate for small business applications. And with the kind of training opportunities that arise around popular packages such as VersaForm, it's possible for the committed novice to make his system run, and run well (and, in the course of it, save potentially thousands of dollars that a consultant might charge). But note that word "committed." Computers aren't simple calculators. Like any powerful tool, they take some knowledge and practice to use properly. Had Cliff Wells known the difficulties that lay ahead, he would probably have gone straight to a consultant. "The important thing," Roger Brown says, "is to decide before anything whether you're going to get involved."

If you do seek professional help, first decide just how much you're willing to pay for it. If you want to spring for design and installation but no more, sit down with your consultant and have him teach you how to maintain and update your system. It's a good idea to do this yourself, by the way—don't entrust total knowledge of your computer system to an employee who, however loyal, is bound to depart your service at some point. Of course, you should get help from the dealer as part of the purchase price, but at some point continued advice and hands-on support will no longer be free. Ask your dealer for a clearly-worded support agreement so you know where that line is drawn.

If you decide to be self-sufficient, take the time to look at the software and its documentation before you buy it. Find out whether instruction in its use is available. Talk to someone who uses it. Try to get a fix on the level of experience and time commitment necessary to master it.

Remember: Even in the darkest moments of his computer nightmare, Cliff Wells knew a computer could make his life easier. "You'd have to be crazy not to computerize my business," he said. But he tried to get there with his eyes closed, and wound up paying an expensive guide who took him back to the beginning before leading him to the light. It was an unnecessary detour, which, with a bit of advanced planning and a firm understanding of the complex relationships between dealer, user, consultant and software manufacturer, others should be able to avoid.

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Your Insurance Can Ruin You

Ninety-nine out of a hundred computers aren't covered. Can you afford to replace all your hardware, software, and data?

by Trudy E. Bell, Senior Editor

Linda W., a writer from Northern California, was the proud owner of a brand new IBM Personal Computer. She was especially proud because she had nearly mastered WordStar, and was discovering how much the word-processing program could help her in her work. But one afternoon last fall, as Linda was writing an article in the comfort of her living room, her landlord knocked at her door and asked to change a defective lighting fixture in her bathroom. He shut off the main power switch to her apartment, replaced the fixture, and restored the power. When Linda returned to her computer, her WordStar disk wouldn't boot.

Linda took the floppy disk to her computer dealer, who examined it. There didn't seem to be anything physically wrong with the disk. All he could determine, from what she told him, was that when her landlord restored the power to her apartment, a sudden surge of electricity erased the disk—rendering her $600 WordStar disk worthless.

A Hollywood psychologist was presented with an Otrona Attaché computer by a grateful celebrity who was one of the doctor's patients. The doctor, touched by the gift, placed the computer on his desk and photographed it to show friends and relatives. A few days later, as he was juggling several packages at the entrance to his office, the doctor left the computer out in the hall while he put the packages inside. When he went back for the computer, it was gone—stolen from his doorway in just one unguarded moment.

Both of these stories are true. And they are not unique. "Theft and power surges are the two leading causes of loss to personal computers," says David K. Johnston, developer of the Safeware insurance policy for Columbia National General Agency in Columbus, Ohio. According to Johnston and others, theft accounts for about half the personal computers lost each year, a proportion that may skyrocket with the growing popularity of portable computers. Power surges that destroy machinery or data account for another third of the losses.

Fortunately, both these stories have happy endings. Linda W., concerned about the investment she'd made in her IBM Personal Computer, had taken out an insurance policy with the Personal Computer Insurance Co. in San Jose, Calif. "On the strength of her computer dealer's evaluation that a momentary power surge had erased her WordStar disk, we reimbursed her for the full cost of the disk—enough for her to buy a comparable word-processing package," says Jan Kellogg, co-owner of PCI and the corporate insurance broker for Apple Computer Inc. And the Hollywood doctor had treasured his Otrona Attaché computer enough to buy Safeware personal computer insurance. "Since the computer had been a gift, he had no sales receipts to prove ownership," recalls Johnston, "but when he presented the photos with his claim, they were enough to satisfy us and he was reimbursed."

But many other people are not as well-protected as Linda W. and the doctor. "Most people think about insuring a computer the day after it's stolen," Johnston observes wryly. And if they do think of insurance beforehand, they reason, "Oh, my home and office and their contents are insured; I must be all right." Only too late they may discover that most standard home or office insurance will pay them only a fraction of the cost of their hardware—and *nothing* of the cost of their software and data.

In an effort to serve the growing number of system owners, several insurance companies are starting to offer protection which addresses the needs of personal computer users.

Why bother with insurance?

When you purchase a computer, getting the insurance to protect it may well be the last thing on your mind. The whole idea may seem overly fussy compared with the excitement of bringing home your first computer. Or, you might think, "I'll just call up my regular insurance broker and have him make sure my computer is

added to my homeowner's policy." You might even let the whole issue slip.

Consider some statistics, however. For many people, a personal computer is the third largest purchase they'll make—right after their home and car. Even a modest personal computer is a relatively large investment, and many systems can cost upward of $5000 with peripherals. A decent library of software can top $1000. Johnston states: "The key question to ask yourself is: 'If I lost my personal computer, software, and data to some disaster, could I readily replace my whole system? How much would I be crippled by its loss?'"

Ordinary insurance is no help

There are some tricky ins and outs to consider if you want your regular insurance broker to add your computer to your standard homeowner's policy. You may find it's not that simple. "Homeowners' policies are so-called 'named perils' policies," explains Kellogg, "meaning that they generally cover the contents of your home only against specific, named disasters such as theft, fire, and flood. They will not protect your computer against a host of other traumas that it is far more likely to suffer." For example, you won't collect a dime if your system was incapacitated by a power surge—unless the surge happened to ignite a fire and the flames engulfed your computer.

Another important point is even if your computer should be stolen or ruined by some catastrophe that's covered by your homeowner's insurance, you're still in for a shock. "Under most coverage, the only compensation you'll get is the depreciated value of the hardware," says Johnston. You might find you can only recover $1500 for a system you spent $5000 on two years ago—and that compensation would hardly buy you a comparable new system. For software the situation is even worse: At best, you may be able to collect for the value of the blank floppy disks. You won't recover any of the cost of your software packages.

If you use your personal computer at home for professional purposes, you may be in the worst position of all. "By the simple act of taking a business tax deduction for the use of your computer, in the eyes of the IRS and of many insurance companies you've classed your computer as business property," observes Hillel Segal of Data Security Insurance Agency in Boulder, Colo. "Many homeowners' policies will not cover business personal property—even though the machine may be sitting right there in your living room."

There are variations on this theme of exposure. If you take your personal computer to your office, and it's stolen, you're still out of luck. "Corporate office-contents policies do not make good on employees' personal property," Segal continues. "Even if the company is your own business and you've covered your computer with an office-contents policy, it is doubtful that the insurance would also cover your software. Some office-contents policies cover 'valuable papers' as well as equipment and furniture—but there is still some question in the insurance business as to whether information fixed in magnetic media can be considered 'papers.' It may only cover your documentation manuals." And if you have a portable computer, the situation is even worse: Neither your homeowner's insurance nor your office-contents insurance will cover your computer while it's away from your office or home.

The purpose of these tales of horror is not to induce paranoia. In all likelihood, nothing will happen to your personal computer any more than it will happen to your house or car. But that's just the point. Catastrophes *do* happen to people's homes and cars. Although insurance won't prevent a disaster or a crime, people buy insurance to protect themselves from a total loss. Just as you wouldn't think of having an uninsured home or car, you might want to think twice about leaving your personal computer and the information in it uninsured.

Now for the good news . . .

In the past year several insurance companies have perceived the need for hardware and software protection and have begun to offer policies for personal computer users. Depending on the company, annual rates range from as low as $35 for $2000 worth of protection to $175 for $25,000 worth of protection. Although personal computer insurance is a novel concept, computer insurance is not: Mainframes and minicomputer systems have been covered by electronic data-processing insurance for more than a decade. Now that personal computers have moved into individual homes and offices, that protection is being tailored to meet those specific needs.

One of the first companies to offer personal computer insurance was Columbia National General Agency. Its Safeware policy provides various amounts of coverage depending on the size and value of your system. The Safeware policies are underwritten by The American Druggists' Insurance Co., a member of the Armco Insurance Group, one of the nation's major property, casualty, and life insurers.

Another source of coverage, the Personal Computer Insurance Co. (PCI), endorsed by the International Apple Core user's group, offers policies for various amounts of coverage—plus optional business-interruption insurance that will pay for alternate equipment or services while yours is being replaced or repaired. PCI's policies are underwritten by the CIGNA group, which incorporates Aetna Casualty Co. and the Insurance Company of North America.

The newest company on the personal computer insurance scene is Data Security Insurance Agency.

Several insurance companies have begun to offer protection for personal computer users.

Aimed at businesses rather than homeowners, Data Security's blanket policy costs $175 a year, and provides $25,000 worth of protection for hardware and software. In addition to covering direct physical loss to your equipment and programs, it will also reimburse you for the cost of reconstructing your own data, and will cover losses due to dishonest acts, fraud, or misuse of your personal computers by any employees or outside parties. This policy is offered jointly by the Association of Computer Users and The St. Paul Fire and Marine Insurance Companies.

All of these firms have tailored their policies to the needs of personal computer users and the disasters they are most likely to face. But although the policies have many features in common, they differ in specific details that could be important.

All three companies insure the hardware and purchased software regardless of where you take it within the U.S. They all offer what's known as "all risk" policies—meaning that *every* kind of imaginable disaster is covered except for some obvious exclusions, such as nuclear war. (However, for your information, if your computer succumbed to "direct loss by fire resulting from nuclear reaction, nuclear radiation or contamination," you could, in theory, collect.) Catastrophes covered under an all-risk policy range from accidental breakage, to water damage from leaking sewer pipes, to an auto accident while you're transporting your computer in your car, to extraordinary damage to equipment caused by lightning and external electrical problems. PCI will not make good on electrical damage from power sources "if the charge originates more than 100 feet away" from your personal computer; but Columbia National and Data Security will protect your investment from brownouts and other problems that may originate at the local power company.

All the policies cover the replacement cost of your system rather than its depreciated value—meaning you can claim the cost of a comparable new system, even if the exact equipment you bought a year or two ago is more expensive now or has been discontinued. These policies also cover printers, modems, and plotters, as well as the main computer. The Safeware and PCI policies even cover your TV if you use it regularly as the video screen for your computer.

But where personal computer insurance really pulls its weight is in its

BUYER'S GUIDE TO PERSONAL COMPUTER INSURANCE

Insurance Agency	Underwriter	Name of Policy	Amount of Protection	Annual Premium	Deductible
Columbia National General Agency, Inc. 88 East Broad St. Columbus, OH 43215 1-(800) 848-3469	The American Druggists' Insurance Company	Safeware	Up to $2000 $2001-$5000 $5001-$8000 $8001-$11,000 $11,001-$14,000 $14,001-$17,000 $17,001-$21,000 $21,001-$24,000 $24,001-$27,000 $27,001+	$35 $60 $75 $90 $105 $125 $140 $155 $170 call for quote	$50
Comments: Covers replacement cost of all hardware, all purchased software, and all media; covers cost of custom software developed by outside parties; protects against all risks including accidental damage, and electrical disturbances regardless of source; business interruption insurance available separately.					
Data Security Insurance Agency, Inc. 4800 Riverbend Rd. Boulder, CO 80301 (300) 443-3600	The St. Paul Fire and Marine Insurance Companies	The ACU All Risk Small Computer Policy	$25,000 $25,001+	$175 call for quote	$250
Comments: Intended for businesses. Covers replacement cost of all hardware, all purchased software; covers reconstruction cost of custom software and documentation and data; covers against dishonest acts or misuse of computer by employees or outside parties; covers extra expenses needed to continue your business as a result of a loss; protects against all risks including accidental damage or erasure of data, and electrical disturbances regardless of source.					
Personal Computer Insurance Agency 1655 Willow St. P.O. Box 28506 San Jose, CA 95159 (408) 723-8107	CIGNA (Aetna Insurance Co.)	PCI policy	Up to $7500 $7501 to $10,000 $10,001 to $15,000 $15,000+ $2500 business interruption	$50 $65 $95 call for quote $10	none
Comments: Covers replacement cost of all hardware, all purchased software, and all media; covers cost of custom software developed by outside parties; protects against all risks including accidental damage and electrical disturbances originating within 100 feet of the computer; offers optional business interruption insurance that covers extra expenses needed to continue your business as a result of a loss.					

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The policy from Data Security is unique in the software area, because it insures you against "loss or damage to, or accidental erasure of, data stored in the computer system, whether in the memory or on the media." Specifically, it will reimburse you for "the actual cost of reproducing lost or accidentally erased data, programs, documentation, and source materials." Data Security's policy will also "pay extra expenses you incur from the date of your loss for as long as it should reasonably take to resume normal operations."

Protect your business

As personal computers become more powerful (with 32-bit machines and hard-disk mass-memory storage capacity) some businesses are coming to rely on them exclusively, instead of considering a minicomputer system. But having all your information in one place can expose your business to unauthorized access. The fact is, computer hacking is on the rise—especially for personal computers that may be linked in networks or that transfer data via the telephone lines.

In addition to taking physical precautions and electronic safeguards to secure your data and personal computers, you might find it worthwhile to consider insuring your hardware and software in the event that your security is breached. Data Security's policy is the only one that offers businesses coverage against dishonest or fraudulent use of your personal computer system, either by employees or by outside parties. Up to the policy limit of $25,000, the insurance will reimburse you for the "loss of money, securities, or other property you may own, lease, or rent from others, or for which you are legally responsible, which results from computer theft."

If you want a larger policy, or want to tailor something to a unique business situation, you can look into the Unauthorized Computer Access Insurance policy recently introduced by Shand, Morahan and Co. of Evanston, Ill. Shand, Morahan is an underwriting firm which has been insuring larger computer systems for about 10 years; its Unauthorized Computer Access Insurance, which is intended for larger systems, could be tailored to smaller systems according to Don Brayer, vice president, underwriting.

"It's a computer-crime cover designed to protect businesses that rely on computers for day-to-day operations," explains Brayer. "It protects the business against the white-collar criminal or angry ex-employee who may try to shut down the system, destroy files, damage programs, transfer funds or inventory, or commit other illegal acts."

The policy won't prevent a crime from happening, but it will reimburse your business for the loss of information destroyed or tampered with, plus the extra expense of getting the system back up and running. And that kind of economic protection can prevent a computer break-in from putting some small businesses out of operation altogether. It will also protect you against the liability of losing other people's information, such as records of credit and transactions, stored in your system.

Shand, Morahan also offers what amounts to malpractice insurance for computer-related businesses, similar in concept to the medical malpractice insurance doctors carry to protect their practices. Say you use your personal computer for a business related to computing—for example, to offer mailing-list services to others, or to write computer programs on contract. And say a program you delivered at a critical time malfunctioned either because of an undetected bug or an omission. If that problem resulted in a delay or loss to one of your clients, that client could sue you to try to recover the loss—just as a patient might sue a doctor for some mishap. You can protect yourself and your business against such suits, however, if you carry EDP Errors and Omissions Insurance. According to Brayer, a small computer-related business with revenue as modest as $40,000 to $50,000 per year might find it worthwhile to look into such insurance. Depending on the terms, a policy costing as little as $500 a year could protect you against suits of up to $250,000 in potential damages.

The bottom line

The thought of insurance makes some people uncomfortable, because they know they won't reap the benefits of the insurance unless the worst that could happen, happens. But others feel they're buying peace of mind.

As Johnston says: "The bottom line is: Is your computer important to you? You shouldn't insure a computer just because it cost $1000. If you don't have business uses, just because your homeowner's policy doesn't apply doesn't mean you should insure it. But if it's important to your business, and if in the worst of worlds you couldn't replace it in a reasonable time, that's when insurance really becomes necessary."

Brayer feels even more strongly. "If you're willing to insure that lamp in your living room, it would stand to reason that you'd want to insure the center of your business. It's often amazing that people would leave their livelihood unprotected."

The Racer's Edge Of Computer-Designed Sails

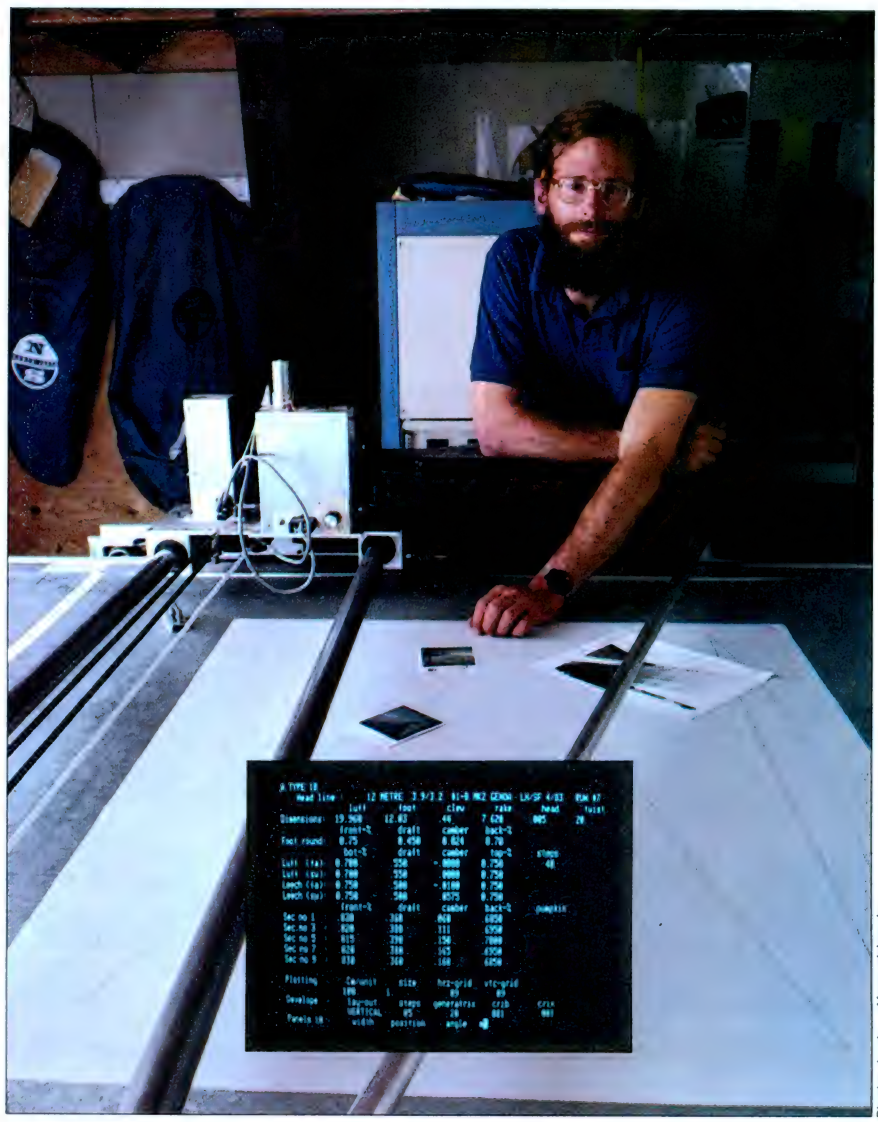
The more information you have, the better your chances of making a good decision. It works in all walks of life—even in a yachting race

by David Gabel, Senior Editor

If you want to know just how much your personal computer can do for you, there are two tough applications you might want to try—computer-aided design, and real-time control. They're tough for two reasons: The hardware can be expensive; and these applications take a degree of technical sophistication that the average person doesn't have.

At least that's the common perception. Yet the argument can be made that these perceptions are either wholly or in part wrong. Some people are using personal computing for both applications, and they don't work with computers for a living—they're sailors. They are, however, a special kind of sailor—men who will bring the British yacht *Victory* to the America's Cup Challenge this summer.

The America's Cup pits boats of the 12-meter class against one another. While the yachts are governed by rules which ensure a level of equality among competitors, the rules do allow some room to maneuver. David Duffy, the American liaison for the Victory Syndicate, owners of *Victory*, says "Many people think that the 12-meter designation means the boats are 12 meters long. That's not true. There are all sorts of numerical ratios that are taken into account, and from which formulas are derived. The actual dimensions of the boat can vary,



Photos by Lee Youngblood

Computing can play a critical role in the design of a sail.

so long as the final answer is 12."

Nevertheless, there isn't a lot more that can be done with the design of a yacht after the hull has been designed, and the sail area determined. If she's to get more speed, it will have to come from the sails themselves, and from the skipper and crew.

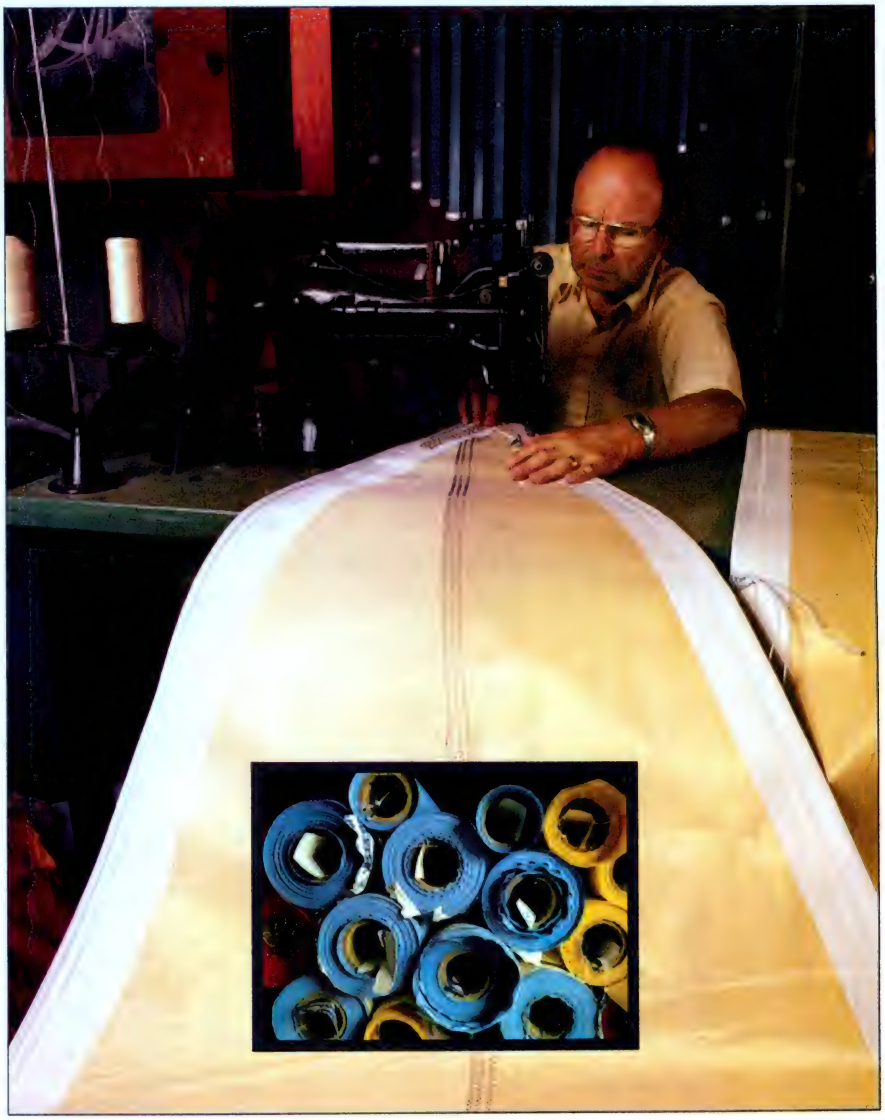
While sails have certain parameters which can be quantified, few people would argue that sail design is a science, or even an engineering discipline. Most would agree it's an art. To a degree, the sail designer instinctively knows what will happen if the sail takes a certain shape in a certain breeze. Designing sails that way works well for normal boats in normal conditions. But in a situation as competitive as the America's Cup, designing a sail entirely on gut feeling isn't enough. To get a winning performance, every possible way of improving the design has to be explored.

It's on this point—the design of the sail—that computing can play a critical role. The saving in man-hours by using a personal computer is enormous. Simulations of sail response to various wind conditions help the sailmaker "see" things he would otherwise have needed months to identify and correct.

How computers help

Designing better sails for the *Victory* is the job of Angus Melrose, chief sailmaker for the Victory Syndicate boats. Melrose begins the design process on intuition based on experience. "I have to go by what my gut feeling tells me." Too often, that's all he has to begin the job with, because there isn't enough hard information available for him to make a rational decision. In corporations, managers are relying on personal computers to give them information they can use in the decision making process. "What if," they ask the computer, "I change this parameter or that one? What will this change do to the shape of my organization?"

North Sails International, which owns the sail design program used by the Victory Syndicate, uses that program in its own sail lofts. The photographs on this and following pages show steps in the design and manufacture of a sail at North's loft in Alameda, Calif. Sail panel shapes are determined with the help of a computer, operated here by North Sail designer Larry Herbig, who also designs sails for *Defender*, a potentional U.S. rival to *Victory* in the upcoming America's Cup Challenge.



Melrose uses a computer to find out how the cut of a particular part of the sail will affect its overall shape. "What if," he asks, "I want to put just a little more twist in the leech of a main for light air? What should I do to the panels that will make up the sail, to get the final shape?"

The first part of Melrose's problem is to design each part, or panel, of the sail, so that the completed sail will take the correct design shape. The next obstacle is the stretch of the fabric. Some fabrics stretch more than others, and the stretch can ruin the sail shape. The stretch also varies at different parts of the sail, since the wind pressure varies over the sail surface. All these factors affect the airflow over the sail, and the airflow is what generates the lift and pulls the boat through the water.

For Melrose, a personal computer cuts down the time that passes from thinking about how a new sail shape will affect performance to actually testing the sail.

"Before we had the computer," says Melrose, "the sailmaker would decide what shape he wanted the sail to take. After that, he would run through hours of calculations to determine what the panel shape would be. He'd build a simple kind of physical pattern, and lay the sail material over that pattern for cutting. When that was finished the panels would be sewn together, and the sail tested. After the tests would come revision, and the whole process would start over again."

Watching Melrose calculate a new sail design is like watching a manager calculate a new budget. He uses a program written by Michael Richelson of North Sails and which is on loan to the Victory Syndicate. The program runs on a Xerox 820-II computer linked to an Epson MX-80 printer and a Houston Instruments DMP-40 plotter. "We just got the Xerox," Melrose says, "because the program was developed on one of them, and it runs much faster on this than it did on the Apple with CP/M we had before. The Apple performed very well", he adds, "but it would take hours to do calculations that the Xerox does in about 20 minutes." David Duffy notes that computer manufacturers have been very helpful in donating equipment to help the Victory Syndicate in its efforts. "They're willing to help in causes like this," he says, "if you approach them in the right way."

To change some of the parameters of a sail's design, Melrose boots his program and loads a design he's already developed. If he were starting from scratch, he'd have to enter the complete design from the keyboard, but he already has a lot of data in his data base from previous designs he's developed, manufactured, and tested.

Melrose uses an on-screen editor called VEdit, from CompuView Products in Ann Arbor, Mich., which allows complete control of the cursor on-screen. He moves the cursor to a parameter of interest, changes that parameter, and moves on to the next one.

"On the first design I did on the computer," Melrose says, "I had to enter all the parameters of the sail.

If he doesn't get the shape he wants, he goes back to his computer model and starts changing the parameters.

Now I just edit an input set. So, let's say that now I want to come up with a really new design. The first thing I want to look at is curvatures." He moves the cursor to the part of the input set that describes how the sail surface will curve when the sail is full. The curve is described by a set of tangents to the surface at various points. These surface points are referenced to the foot of the sail, and to the luff, where the sail attaches to the mast. You can form a mental image of the way the sail will fill by looking at a series of these surface tangents. If the numbers are positive and increasing—1, 1.2, 1.3, etc., then the sail is exhibiting greater curvature along the line where the tangents are displayed. If the numbers decrease, then the sail has less curvature at that point; the sail is flatter there. If the tangents go negative, then the curve of the sail will reverse, giving a sort of "S" shape. Melrose knows, from gut feeling, what he wants the first design of a sail to do, and he puts the shape into the computer.

"Building" the model

Once that's done, "then the machine takes over," he says. "It literally 'builds' a mold of the sail shape in memory, and then it 'drapes' the material over the mold to determine what way the material should be cut to get it to fit closely over the mold. After it's done that, it prints out the dimension of each sail panel, so all we need do is cut the panel and sew the sail together."

Design is a trial-and-error process. A designer has an idea he "knows" will work. From this idea he builds some sort of theoretical model of the device, process, or whatever. Then he tests the theoretical model to get the kinks out, and proceeds to a physical model. He may have to change the physical model somewhat, because the material didn't perform the way he expected it to, or some of his initial assumptions were wrong, or because some other unexpected condition occurred. A computer helps in these design iterations, by "taking the donkeywork out," as Melrose says. "The computer made the sail designer's life a lot easier." For one thing, it provides a listing of numbers that describe the mold shape. If those numbers look OK, then the plotter draws the shape so the designer can see a real picture of his mental image.

But, there's really only one way to test the theoretical sail design, and that's to hoist sail on the yacht under the proper conditions and see what shape the sail assumes. *Revenge*, the chase boat, goes out whenever *Victory* is under sail. One of her crew's tasks is to take pictures of new sails from astern, where the shape can be easily seen. Melrose has a file drawer of photos of the sails under different conditions, with tangent lines drawn on the reverse side. He can tell what the sail was doing from those lines. If he didn't get the shape he wanted, he goes back to his computer model and starts changing the parameters to make the sail behave as expected.

"The model," says Melrose, "is never better than the information you put in. You have to assume things, like how much a particular material will stretch along the warp or woof. To do that, you assume it will behave like a similar material, and design around that assumption. But then you have to test your assumptions with the real design, and change it if it doesn't perform according to your expectations."

It's not unlike what happens in any kind of organization. Build a model of expected activity, using assumptions and theoretical considerations, construct the physical counterpart of the model, observe the model under realistic conditions, and change the physical system—and the model too, while you're at it—to account for those conditions.

What most organizations don't have is a real-time monitoring capability. They observe the behavior of the physical system—through monthly activity summaries, debriefings of personnel, or just bull sessions—but only after the performance is done. It's not observation while the action is taking place. But personal computers have given the Victory Syndicate a real-time, performance-evaluation tool in addition to help for the sail designer. By using a minicomputer on *Revenge*, an Apple mounted on *Victory*, and a lot of hard work, the crew personnel know how they're sailing the boat, compared to what they could do, while they're doing it.

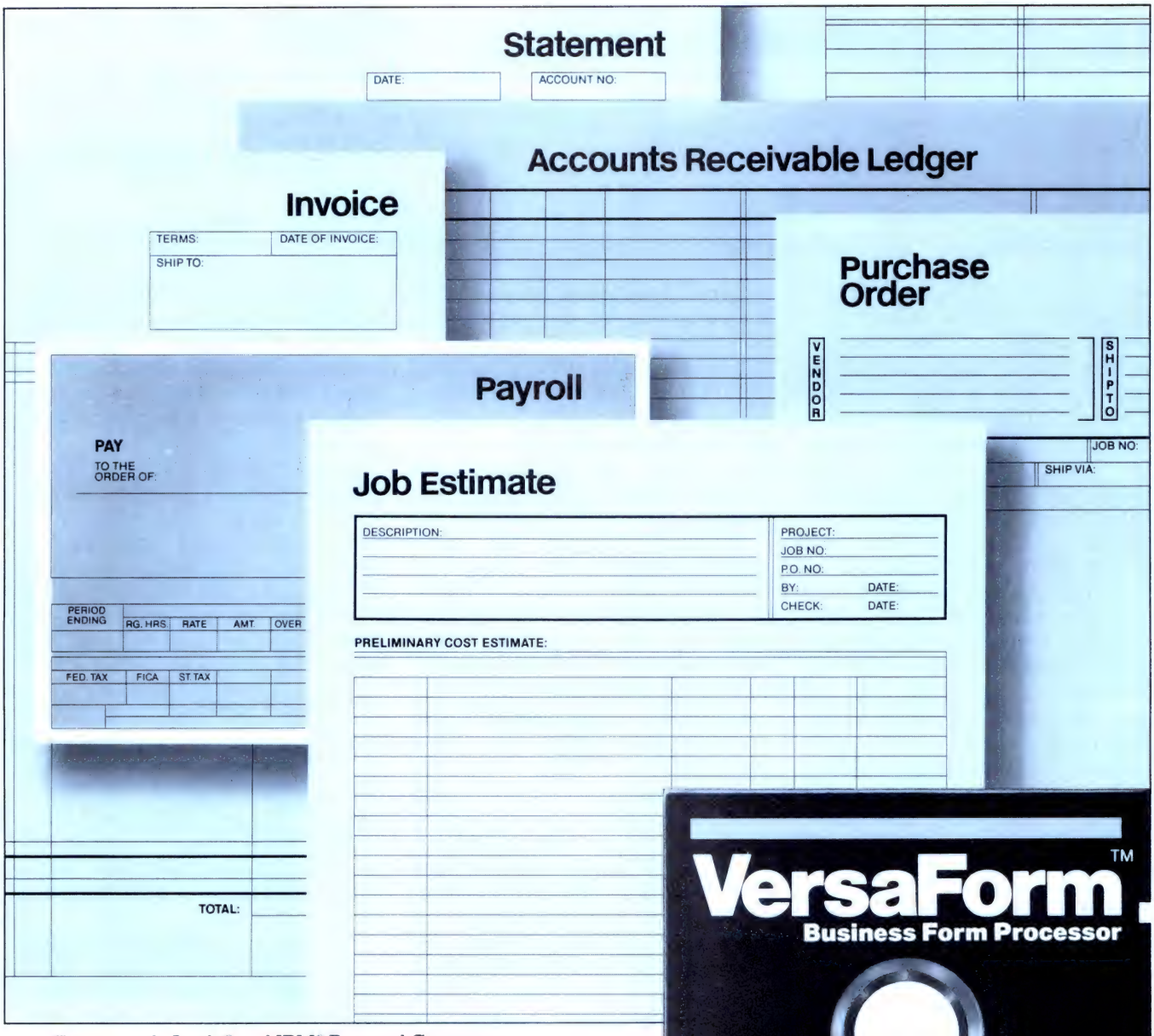
On board Victory

When you board *Victory*, you step onto a machine built with one purpose in mind—winning. The people who man her are imbued with that single idea. They want to win. And yet, they know as much about computing as they do about boats—maybe more.

The *Victory* cockpit is fitted with LCD (liquid-crystal display) readouts. These readouts are the ones used by the skipper when he's under sail to tell him what he's doing. The cockpit also has a CRT which displays the "tactical" plot. A small keyboard mounted in the cockpit allows various parameters to be displayed on either the LCD readouts or the CRT.

Derek Clark, the skipper of *Victory*, uses personal computing as a performance-measurement tool against which he can constantly check his handling of the boat. He applies the performance measures he gets from the computer, and from onboard instrumentations, in a kind of feedback-control loop, to make *Victory* perform as the racers know she can.

Clark is as much at home talking about the computer system as he is talking nautical terms. In fact, he has a degree in computer science. One of the many important jobs he has on *Victory* is calibrating the real-time monitoring system.



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CIRCLE 39

An Apple is mounted under the cabin sole, or floor, in a metal box. The box latches to the overhead.

"What we've got here," he says with a slight British accent, "is an on-line monitoring and telemetry system." (Telemetry is merely sending performance data over the air to somewhere else.) "The Apple computer controls the whole thing, and it also makes up one of the stations on the network. We can see what the instruments are saying while at the same time they're sending the data over to *Revenge*."

An Apple is mounted under the cockpit sole, or floor, in a metal box. The box latches to the overhead, but can be swung down to allow access to the computer and floppy-disk drive it contains. The box is ventilated—it can get quite hot in the confined space below the decks of an aluminum boat when the sun is shining—and it keeps the computer and drive dry and fairly cool. "We sailed with it all winter long in the Caribbean," says Duffy, "and we only had one drive failure. Apple replaced the drive very quickly."

A boat's performance for a given wind and course can be changed by adjusting a number of parameters. The trim of the headsail, for example, can increase or decrease speed. The bend of the mast will do some mainsail shaping to account for different conditions. If the rudder angle is too great, the boat will slow. The only way to correct the problem is to have some measure of what the performance should be, and then try to match that performance.

So, the first thing to do with a computer system is determine what a boat is capable of doing in a given set of circumstances. That's one reason why *Victory*, and her sister *Australia*, an unsuccessful challenger in 1980, were in the Caribbean over the winter. Their crews were spending that time familiarizing themselves with *Victory*, and the computers were storing performance data from which to build an optimum-performance data base.

"We raced the two boats against one another," Clark explains. "We know *Australia* is a fast boat, but we don't know everything about *Victory* since she's so new. So we compare what *Australia* does in the same wind as *Victory*, and we have a known reference for performance. We're also sending performance data over to *Revenge*."

Performance and wind data are measured with instruments mounted in the sailboat. The Apple controls the network, handles the telemetry, and records data for future analysis.

Revenge has an ICL minicomputer mounted on gimbals in her cabin. The gimbal system, a large aluminum frame, keeps the computer vertical when the boat is pitching at sea, so the hard-disk drives won't crash. After the data are transferred to *Revenge*, they're stored on the hard disks. A graphics terminal plots the variables as they are received.

"It's a complicated save," Clark notes. "We put the data into a circulating ring, something like a ring counter. That's so we can get the data refreshed quickly, or at least quickly enough for our purposes." After the data have been massaged to develop the performance characteristics for the boat, they are stored on a PROM (programmable read-only memory) so the on-board computers can get to them quickly.

Knowing the wind history over the course you're going to sail is important, because wind patterns are cyclical, and if you know what they are, then you know how to take advantage of them. "We can draw the course we're going to run," says Clark. (The America's Cup race always follows the same course. The marks, the places where boats turn, are well known, so it's easy to plot your desired course.) "Then when we set our position, the system gives us back the bearing and distance to the mark, and can draw in the whole course for us." Races can be won or lost through choice of bearing to sail, so any help the skipper can get for picking a bearing is greatly appreciated, and wind history plays a part in picking that bearing. If you know that at a certain time of day the wind will start to change direction, you can plan for that, and get the most drive from your sails.

A course plot isn't the only thing the skipper has access to. He can get other data from a menu displayed on the CRT in the cockpit by selecting one of several keys on the keyboard next to the display. Some of the data are displayed on the LCD readouts, while others are shown on the CRT. He can, for example, use one set of readouts to show his actual boat speed, and another to display optimum boat speed. If the two numbers don't match, then he can correct what he's doing to bring his performance up to snuff.

There are many variables on a sailboat that can be adjusted to bring the output—velocity made good to the mark—into line. Before computers were employed to measure and record performance, a skipper "felt" the boat and made his adjustments according to his gut. With the computer, the Victory Syndicate hopes sufficient information will be available so real-time adjustments can be made on a better basis than gut feeling.

While the use of personal computing in the America's Cup Challenge is an advanced application, it's really only an extension of the things personal computers do best: handling enormous amounts of information, performing long calculations quickly and accurately, and giving users access to information in a way that can help them boost efficiency and productivity.

You can apply the same principles in the office, the factory, the design lab, or in the home. You can use the personal computer to design models, observe and measure variables, and make corrections to models based on your observations. It is, after all, what the world is coming to.

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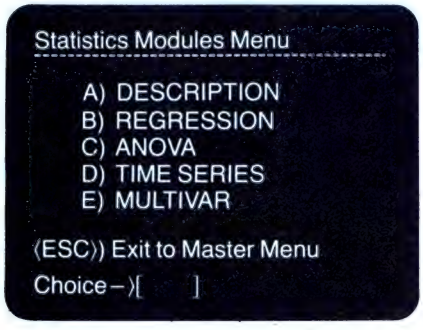

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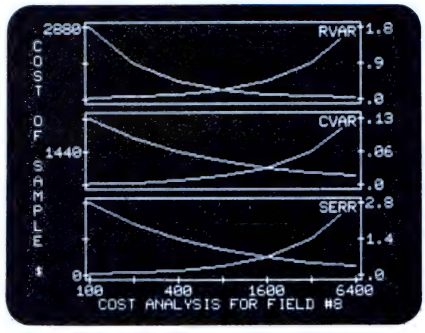

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CIRCLE 41

Computer Programming: What's In It For You?

So you'll never write a line of code. But you'll sure draw a crowd when you speak the languages

by Paul Bonner, Associate Editor

Computer programming is for nerds, right? You know: those funny looking guys with thick glasses who wear white shirts buttoned at the collar (with no ties) and fill their breast pockets with ball-point pens; long-haired, bearded refugees from the love-and-peace-generation who traded in their electric guitars and amps for S-100 buses and surplus circuit boards. People with nothing else to do. Those are the only ones who waste their time trying to program a personal computer, right?

Wrong. By a mile.

Today, businessmen with plenty of other things to do with their time are studying the art of programming and taking advantage of the wide variety of software, books, and specialized computers. Some of these people are driven by pure curiosity, others by an inability to find software that meets their needs, and still others by the belief that learning to program will give them a competitive edge.

The curiosity angle is easy to figure. After you've been working on a personal computer for some time, it's natural to wonder how it works. Programming, the means by which you put a computer through its paces, goes a long way towards satisfying that curiosity.

It's also easy to understand how people can become frustrated by the idiosyncrasies of commercial software, or by an inability to find a commercial program that exactly meets individual needs. It's been said that you can't write a job description for any job worth doing. That implies that any challenging job is unique, making it difficult for a manufacturer who wants to sell thousands of copies of his program to supply a tool that fits the unique requirements of such jobs. It also suggests that the person doing such a job is unique, thinks uniquely, and works in a unique way. That may be why you can read a glowing software review, only to find when you buy the program that its command structure and the way it works don't seem logical and natural to you. Learning to program helps solve these problems, since you'll be able to write applications programs tailored to fit your needs and preferences.

Finally, there's the possibility that knowing how to program will give you an edge in business. Understanding more about computers than can be learned solely by using commercial applications programs may enhance your value to a company.

So, there are good reasons to be interested in learning how to program. If any of them apply to you, then the next question is: What programming language should you learn? The programming languages available on personal computers include BASIC (in all its forms), Pascal, Logo, FORTH, assembly language, and Savvy. Since the primary factor in selecting a language should be your own requirements—what you want your computer to do— it's important to understand the relative strengths and weaknesses of each of the languages available. Once you have that understanding, the best course is probably to study the simplest language that meets your needs.

There are certain distinctions to remember when discussing computer languages. Primary among these is the difference between interpreted and compiled languages. An interpreted language, such as Logo or BASIC, has the advantage of immediate command execution. You can type in a command such as PRINT "Dog" and the computer will immediately respond by printing the word "Dog." However, the drawback to immediate execution is that the computer must interpret each command it encounters. Thus, during a program consisting of 20 PRINT commands, the computer would have to look up the word PRINT each time it encountered it, determine if it is a legal command, and then decide what it is supposed to do with that command. All this extra work for the computer can considerably slow down the execution speed of the program.

Compiled languages, on the other hand, are stored in a form that the computer can use much more effi-

There's the possibility that knowing how to program will give you an edge in business.

Examples of Turtle graphics and the Logo programs used to create them, taken from the Krell Logo package. Logo is considered an excellent introductory language because it is easy to learn and fosters good programming habits. Turtle graphics are created by directing the movements of a 'Turtle' (seen in the center MANYFLAGS 50) around the screen.

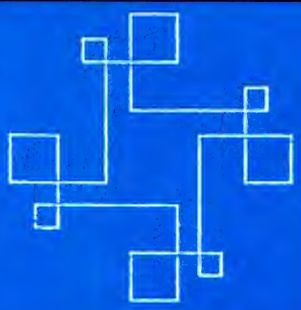
```
TO SPINSQUARES :SIZE
 REPEAT 4 [FORWARD :SIZE RIGHT 90]
 RIGHT 20
 SPINSQUARES :SIZE
END
```

SPINSQUARES 40

```
TO MANYFLAGS :SIZE
 REPEAT 6 [FLAG :SIZE]
END
```

MANYFLAGS 50

```
TO SHAPE4
 REPEAT 4 [SHAPE]
END
```



SHAPE 4

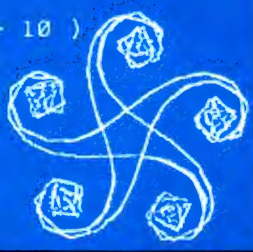
```
TO CRYSTAL
 SHAPE
 LEFT 45
 FORWARD 70
 CRYSTAL
END
```

CRYSTAL

```
TO SHAPE
 REPEAT 2 [FORWARD 40 RIGHT 90]
 REPEAT 2 [FORWARD 20 RIGHT 90]
 FORWARD 40 RIGHT 90
 REPEAT 2 [FORWARD 10 RIGHT 90]
 FORWARD 20
END
```

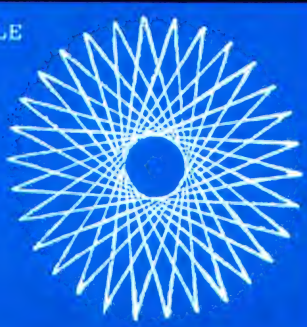
SHAPE

```
TO INSPI :SIDE :ANGLE
 FORWARD :SIDE
 RIGHT :ANGLE
 INSPI :SIDE ( :ANGLE + 10 )
END
```



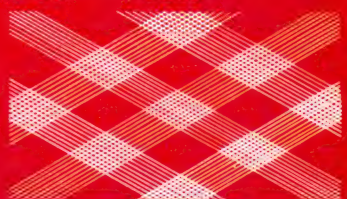
INSPI 10 1

```
TO POLY :SIDE :ANGLE
 FORWARD :SIDE
 RIGHT :ANGLE
 POLY :SIDE :ANGLE
END
```



POLY 100 156

```
TO PLAID
 IF ( RANDOM 7 ) = 2 THEN BG RANDOM 6
 PU HOME PD RT 60 PC RANDOM 6 FD 9000
 PC RANDOM 6 SETH 300 FD 9000
 PLAID
END
```



PLAID

ciently. You type the program into the computer much as you would an interpreted language program, but before you can run the program you first send it to the compiler, where it is reduced to machine instruction code. This greatly speeds up program execution. However, editing the program is more difficult, because every time you make a change you must go through the time-consuming task of recompiling the whole program before you can see what effect the change has had.

One other important distinction, albeit a much less concrete one, is between structured and non-structured programming. The idea behind structured programming is to organize well-defined and well-identified subroutines that serve as building blocks which, when added together, make up an entire program, but which can be addressed or altered separately. A structured program will not necessarily run better than a non-structured one, although it may run a little faster. The real advantage of a structured program, however, is that someone unfamiliar with the program can look at it, understand how it works, and change or update it. In contrast, if a non-structured program consists of too many poorly documented branches and unidentified variables, even its author may not be able to make sense of it three weeks after writing it.

Since a non-compiled form of BASIC comes with most personal computers, it's probably the best place to begin a survey of computer languages. The popularity of BASIC is partly because it's one of the easiest languages with which to learn elementary programming. It has a manageable vocabulary and simple (if occasionally infuriating) rules, or syntax. For anyone who took algebra in high school, short BASIC programs shouldn't look too foreign. However, some critics say that it's difficult, if not impossible, to learn to program in an efficient (structured) manner in BASIC, and some have even claimed that learning to program in BASIC will permanently impair your ability to program efficiently in any other language. However, Orlan Cannon, a computer consultant in New York who programs in three versions of BASIC, as well as Pascal and three versions of assembly language, replies to those criticisms, "There are a lot of good quotes to that effect, but I don't think it's true at all. I find that just about anyone who writes a long BASIC program writes it in a structured manner, and is very open to structured programming."

Why such controversy over a programming language? The answer lies

Photo courtesy of Radio Shack, a division of Tandy Corp

The Color Computer Learning Lab from Radio Shack is a series of eight interactive tutorials in BASIC programming.

in the origin of BASIC. It was originally developed to teach computer science students very simple concepts of programming. But the relatively small amount of ROM needed to store BASIC made it a natural choice of manufacturers when personal computers arrived. That caused the language to be used for far more complex purposes than its authors ever intended, and exposed both its advantages and liabilities. Its advantages include availability, ease of use, easy program modification, and enough versatility to utilize almost any computer function. The price you pay for these qualities is that BASIC is slow, lacks self-documentation, and tends to encourage sloppy programming habits. For example, a very simple BASIC program (written here in Applesoft BASIC), which clears the screen of all text and writes the words "HELLO THERE" at the top-left corner of the screen, can be written like this:

```
10 HOME
20 PRINT "HELLO THERE"
30 END
```

That looks fairly clear and straightforward. Unfortunately, when you're writing a long program in BASIC, it's often necessary to jump around in order to reuse subroutines, and thus conserve memory space and speed program execution. BASIC lets you make those subroutines branch in as disorganized a manner as you like, so a program that accomplishes exactly the same thing as the program listed above could also be written as follows:

```
10 GOSUB 1000
20 PRINT X$(1);" ";X$(2)
30 GOTO 600
500 FOR I = 1 TO 2
505 READ X$(1)
512 NEXT
535 RETURN
600 END
1000 HOME
1010 GOSUB 500
1020 RETURN
9999 DATA "HELLO", "THERE"
```

This example is rather absurd, but it does illustrate how difficult it can be to follow the flow of a BASIC program. As Cannon states, "A much-modified BASIC program can end up being totally incomprehensible. The first version of a BASIC program is usually very easy to understand. It's only when you start adding things to it—error-trapping routines, screen formatting routines, routines to make sure that the person using the program enters the correct information—that you start getting so many subroutines that you can't put in enough remark statements to keep track of what's going on; or even if you could, the program would be too long to fit into memory."

Programming Language Tutorials

COMPANY/ PACKAGE	COMPUTERS/OPERATING SYSTEMS IT RUNS ON; MEMORY SIZE REQUIRED	PRICE	LANGUAGE	ADDITIONAL HARDWARE REQUIRED TO RUN PROGRAM	ADDITIONAL SOFTWARE REQUIRED TO RUN PROGRAM	HARDWARE SUPPORTED	PROGRAM STORAGE MEDIUM	SPECIAL FEATURES/ ADDITIONAL INFORMATION
ATI BASIC Power for MBASIC	Apple II; Commodore VIC-20, 64; IBM Personal Computer; 16k-32k	$75	MBASIC	None	None	None	Disk	
COMPREHENSIVE SOFTWARE PC Pal	IBM Personal Computer; Atari; Commodore; 64k min.	$39.95	BASIC	Disk drive	None	None	Disk	Sound and animation; corrects patterns and runs programs
PC Tutor	IBM Personal Computer; others; 64k	$59.95	BASIC	Disk drive	None	None	Disk	
COMPUTER WORKS INC. Assembler Teacher	Apple; Atari; Commodore; 32k (3.3)	$44.95	6502 assembly language	Disk drive	None	None	Disk	Should know Logo or BASIC; introduction to assembly language programming
EDUCATIONAL COURSEWARE BASIC Tutor Series	Apple 3.3	$280 (9 disks)	BASIC	None	None	Printer (not mandatory)	Disk	Writes programs; new disk available soon
EXCALIBUR TECHNOLOGIES CORP. Savvy I	Apple; 48k	$349	Savvy	Coprocessor (included)	None	Printer	Disk	Single disk, full language data base; can go through Savvy in four hours
HAYDEN SOFTWARE How to Program in Applesoft® BASIC	Apple II; 32k	$49.95	BASIC	Disk drive	None	None	Disk	Workbook; 12 levels, fundamentals to advanced, with hi-res graphics
The Programmer's Workshop for Applesoft® BASIC	Apple II, II Plus, IIe; 48k	$49.95	BASIC (structured programming techniques)	None	None	None	Disk	Assumes knowledge of BASIC; subroutines (scrolling, sound-generation, others)
INTERNATIONAL COMPUTERS Go Forth	Apple II, IIe; IBM Personal Computer; 48k	$59.95	Forth	Disk drive	None	None	Disk	
KRELL SOFTWARE CORP. Logo	Apple; 64k min.	$89.95	Logo	Disk drive	None	Printer	Disk	Complete graphics; includes language and program disk, sample programs, wall chart
LINK SYSTEMS Link Sampler	Apple II, II Plus, IIe; 64k	$59.95	Pascal	Disk drive	Apple Pascal	None	Disk	Includes 21 teaching programs; manual; games and personal finance built in
PRENTICE-HALL INC. Cross Reference Utility (A Programming Aid for the IBM-PC)	IBM Personal Computer; 64k	$29.95	BASIC	Disk drive	None	Printer; monitor	Disk	
Apple II 6502 (Assembly Language Tutor)	Apple II; 64k	$34.95	Assembly language	Disk drive	None	None	Disk	Book included
RADIO SHACK/TANDY CORP. Color Computer Learning Lab (Models I, II, III, IV)	TRS-80; 16k	$220 (entire package); $24.95 each	BASIC	Cassette recorder	None	None	Tape	Shows how to structure programs; eight lessons
REMSOFT INC. REMassem	TRS-80 Models I, III, IV; 16k	$74.95 tape; $79.95 disk	Assembly language	None	Editor/ Assembler required	None	Tape; disk	Ten 40-minute audio lessons accompany program; self-instructing course
SRA Discovering BASIC	Apple II Plus, IIe; 48k	$210	BASIC	Disk drive	None	None	Disk	For beginning programmers; special instructions for young people
STERLING SWIFT PUB. CO. How to Program in the BASIC Language	Apple II, II Plus, IIe; TRS-80 Models I, III; Commodore PET, 64; Atari 800; TI 99/4A; 32k	$69	BASIC	None	None	Printer; disk drive for Apple	Disk; cassette	Based on tutorial approach; workbook for $5.95; received Computer Software Award (Money Magazine)
THE PROGRAMMER'S INSTITUTE The Learing Center	Atari 400, 800; 8k tape, 16k disk	$74.95 cassette; $79.95 disk	BASIC	Light pen (optional)	None	Cassette player or disk drive	Disk; tape	Special skills section
WILEY PROFESSIONAL SOFTWARE Mastering the VIC-20	Commodore VIC-20; 8k	$34.90	BASIC and assembly language	None	None	None	Tape	Self-teaching book with examples of programs on tape
Apple BASIC: Data File Programming	Apple II; 48k	$32.90	BASIC	None	None	None	Two disks	same, but examples on disk
IBM PC: Data File Programming	IBM Personal Computer; 64k	$34.90	BASIC	None	None	None	Two disks	same, but examples on disk
Fast BASIC	TRS-80 Models I, III; 32k	$34.90	BASIC (streamlined form)	None	None	None	Disk	same, but examples on disk
Visible Pascal	Apple II, IIe; 64k	$95	Pascal	None	None	None	Two disks	same, but examples on disk; does not require Pascal card

The other major complaint against BASIC is that it's too slow for many purposes. If you want to write a spreadsheet or a data-base-management program that involves a lot of calculations, or if you want to do high-quality graphics featuring animation or precise plotting, BASIC may make you wait all day for your results. On the other hand, BASIC is more than fast enough for many applications, such as non-animated games or applications that frequently interface with peripherals which cannot operate very quickly anyway, such as a modem, disk drive, or printer. You may find that the advantages of programming in BASIC outweigh other considerations, even with applications for which more advanced languages would be much faster.

There are several versions of BASIC (including C-BASIC and S-BASIC) which, like more advanced languages, compile your program in order to increase its execution speed. These versions also encourage, or even demand, careful, well-ordered programming. Cannon, who uses S-BASIC, says, "Structured BASICs are a good way for someone who is comfortable writing in BASIC to write a structured program like he would in Pascal. The user can start writing the program as if it were a normal BASIC program, and then when you start to get lost, you can divide it up into little modules and start treating it as if it were a structured language like Pascal." He adds, though, that "The problem with a structured BASIC is that it takes a lot more time to write a program, because every time you want to change something and see if it works, you have to compile it. On the other hand, you can write little modules in a non-compiled BASIC and check them out to see if they work, and then transfer them line for line into a structured BASIC module. You really can't do that in Pascal. I tend to initially write a program in BASIC, and then if it's more or less running OK I put it in a structured form and polish it, but I make sure that it's running in a non-compiled BASIC first."

A final point in BASIC's favor is that there are probably more aids to help you learn to program in BASIC than for any other language. You can begin with the BASIC manual supplied with the language by your computer manufacturer. Apple Computers, for instance, supplies a tutorial manual and a reference manual for Applesoft. Together, they serve as both a good introduction to the language and as a source for information about more advanced programming techniques. Radio Shack provides TRS-80 Model I and III users with a 340-page tutorial manual that appears to be quite thorough, although its "cutesy" style and cartoons might become a bit much after about 50 pages. The Commodore 64 user's guide contains a slim but well-organized and informative BASIC tutorial that takes you step by step through the language in a very reasonable manner. Indeed, the only users guide we examined that doesn't contain a tutorial is the one supplied with the IBM Personal Computer. The IBM manual is extensive and well-documented, but it pretty much leaves the beginner to his own resources, and it presents such incongruities as discussing multi-dimensional arrays before dealing with simple math operations such as addition or division.

Nels Winkless believes that a traditional analytical approach to programming "virtually excludes intuitive learners."

Even when your system manufacturer supplies you with a good tutorial manual, you may find yourself wanting a more interactive aid. Thus, you might be interested in any of several disk-based tutorials designed to teach you the fundamentals of BASIC programming. Generally, these are intended to teach you to write a simple program, and show you what areas you have to study to become better skilled. None of these tutorials really claims to make you an advanced programmer.

One of the more comprehensive of these programs is the BASIC Tutor Series for the Apple II by Educational Courseware. The entire series includes nine program disks. According to Victor King, president of Educational Courseware, "The series is structured in a way that doesn't intimidate beginners. It starts out with an explanation of the keyboard and very fundamental things about computing. As you get further into the series, you get into more complicated areas—programming commands, text file, things like that. It builds on itself." King says that by the time a user goes through all nine disks, he should be able to program in Applesoft BASIC. "The last disk is a programming example—substitute your work here, here's how to build a menu, here's how you trap out the values that you don't want to accept as input, etc.," he says.

King reports that many of the people buying the BASIC Tutor Series are business users who "are dealing with a computer in a business environment and want to learn how to do things without having to hire a consultant. They're curious; they're interested in how to program." In order to maintain that interest, the series

Interactive tutorial programs are available for most of the computers on the market.

"is as interactive as possible. We don't say here's this, here's that, we give him an option on what he wants to see, and say, 'Let's program in this command and see what happens.'"

Gail Rothenberg is the marketing manager for Hayden Software. She says the two programming tutors manufactured by Hayden (How to Program in Applesoft BASIC, and The Programmer's Workshop for Applesoft BASIC), are mainly purchased by "people who are interested in computer literacy, who believe that they really need to know more about what's going on with computers, and want to learn computer programming." How to Program in Applesoft BASIC consists of 12 interactive lessons in programming fundamentals, including high-resolution graphics. The Programmer's Workshop for Applesoft BASIC is a more advanced program that assumes the user has some knowledge of BASIC. It discusses structured programming techniques and flowcharts, and it includes several subroutines that the user can either incorporate into his own programs or study as examples of structured programming routines. However, according to Rothenberg, "It's still a beginner's level program."

Similar interactive tutorial programs are available for most of the computers on the market. Among the more popular are The Learning Center (The Programmer's Institute) for the Atari 400 and 800, PC Pal and PC Tutor (Comprehensive Software) for the IBM Personal Computer, and Color Computer Learning Lab (Radio Shack/Tandy Corp.), a series of eight tutorial programs for TRS-80 computers.

Logo

In recent years, BASIC's position as the first choice of beginning programmers has been challenged by Logo. Actually a subset of Lisp, one of the first artificial intelligence languages, Logo has received much attention as an instructional language

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A language must be useful as well as portable if it's to be of any value.

for children. However, Ken Emery of Computer Works Inc., a computer retailer in Harrisonburg, Va., notes, "They're using Logo to teach transformational geometry to upper level math students at MIT, and it's being used in their artificial intelligence labs. No, I don't consider it a kiddie language."

Mark Friedland of Krell Software Corporation (Stony Brook, N.Y.), which markets Logo for the Apple II, notes, "Logo's strong point is that it's very easy to get into and start programming. You don't need to know anything about Cartesian coordinates or numerical variables to start making programs that have graphic output. It's not ideal for business applications, primarily because it's not designed for quick name crunching. But it's good for people who are new to programming and to computers, who want to gain what's commonly called computer literacy."

For the businessman who wants to learn to program, Logo's greatest value may be as a preliminary step to Pascal, a language which is more complex (and more useful in the business world). "You can apply almost exactly what you learn in Logo to Pascal," says Friedland. Adding support to that view is Emery, who says, "If a businessman wants to learn programming, I certainly wouldn't recommend that he start off with Pascal. Logo has the same structure as Pascal, and would give him structures that he could transfer over to Pascal. Logo would be to Pascal what BASIC is to FORTRAN. It's definitely a better introduction to Pascal than BASIC."

Friedland adds that one advantage of learning initial programming concepts in Logo rather than Pascal is that Logo, like BASIC, is an interpreted language. "This means that you can execute Logo statements one at a time in the immediate mode. You can't do that in Pascal. In Pascal, you edit your program, then you send to the compiler, which turns it into machine language. Thereafter you run the entire program at once. Troubleshooting or debugging is more difficult in Pascal," says Friedland.

The Logo package sold by Krell includes a disk containing the Logo language and a second disk containing a series of 15 tutorials called "Alice in LogoLand." According to Friedland, each tutorial teaches four or five Logo commands. "It's not a boring program that you sit through only once because it never changes," he says. "It's interactive, and it lets you be creative."

Pascal

Pascal was developed to teach programming students how to write tightly-structured programs. It turned out to be a fast and versatile language that's become very common for business applications. Cannon says he uses Pascal "for long programs." "BASIC is fine for short and simple programs," he continues, "but a long, structured program in BASIC tends to have lines like '100 GOSUB 40: GOSUB 50: GOSUB 60: GOSUB 70: RETURN.' That's a structured program. If you find yourself writing programs like that, maybe it's time to come up with a language that looks more like English. Pascal gives you a system that lets you keep track of gigantic programs, making them easier to read and understand."

Among the disk-based tutors available for learning Pascal is Link Sampler (From Link Systems) for the Apple II. The Link Sampler diskette contains the Pascal source code for 21 programs, ranging from a very simple program that merely prints "HELLO" on the screen, to a more complex program that adds and subtracts numbers, to maze and tax programs. While using Link Sampler, the source code is displayed on the left-hand side of the screen, while the right-hand side of the screen displays explanations of why certain procedures were used and what the source code accomplishes. More detailed explanations of the programs are given in the manual accompanying the package. All the programs can be compiled using a Pascal compiler. The user can also go into the source code and change any of the programs. No previous programming knowledge is necessary to use Link Sampler, but some understanding of the Pascal operating system, or access to a Pascal operating system manual, is necessary.

FORTH

By implementing industry standards, the creators of FORTH have produced a language which is transportable to many machines. Elmer Fittery, president of International Computers located in Mexico City, Fla., comments, "People who buy FORTH want easily transportable software. A FORTH program will run on any machine with FORTH. Plus, it's a public domain language, so you don't have to pay royalties to anyone. UCSD Pascal is also very transportable, but the language is expensive, and you have to pay royalties for using it to develop software."

Of course, a language must be useful as well as portable if it's to be of any value. Fittery says, "The good thing about FORTH is that even with the standards, there's really nothing you can't do with it. FORTH is very good for doing systems-type work, interfacing hardware devices, and the normal things that you would do with machine code—although FORTH is significantly slower than machine code. FORTH is also very good at doing process code. However, it's a very flexible language. Existing FORTH applications include spreadsheet programs, accounting packages, and even other languages. I've heard of Lisp, Pascal, BASIC, COBOL, and FORTRAN that are written in FORTH, so applications written in those languages become transportable to any machine that has FORTH."

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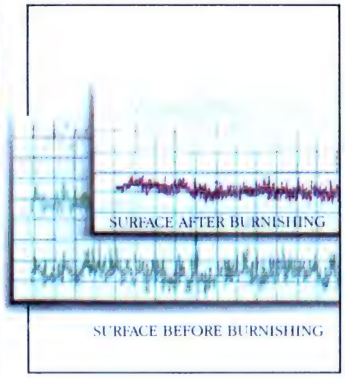

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You cannot program a computer to do what you cannot do yourself.

Fittery says that "It would certainly help to have a background in another programming language before learning FORTH, but the most important thing would be to have a knowledge of reverse-Polish notation (a system in which, to add two numbers together, you would enter "A ENTER B+ " rather than "A + B="), like that used on Hewlett-Packard calculators. That's definitely more important than a prior knowledge of BASIC. BASIC really isn't anything at all like FORTH." Fittery also adds that "There's no requirement that you use reverse-Polish all the time. You're free to write or buy a utility that allows you to do math normally. Basically, when you want something with FORTH you write it, and the words become part of FORTH. There are no CALLs or line numbers or GOSUBs, there are just words, and you can add words that make it do what you want."

To help you learn how to program in FORTH, Fittery's firm markets Go FORTH, a package authored by Fittery. Go FORTH is a tutorial program for the Apple II or IBM Personal Computer. The language is included with the program. The program "displays a screen that explains that 'GO' means go to the next screen, and 'BACKUP' means display the previous screen, and 'HELP' means explain the commands. At that time, the FORTH language is active. These are standard FORTH commands used during the program," he says.

Savvy

Savvy is a language unlike any other. It is a "natural language"—its commands are common English words. Any function that you program in Savvy becomes part of its basic command vocabulary. In addition, Savvy incorporates a pattern-recognition algorithm that makes working with the language very easy. According to Willard K. Rice, Jr., vice president of marketing for Excalibur, "Savvy is forgiving to programmers. They don't have to remember program code or exact names of routines they've already created in order to reference earlier program parts—a close approximation will do. Also, Savvy is self-documenting in clear, English listings, so it's easy for developers to debug and check logic, even to the point of asking the system to show mathematical procedures rather than just results."

According to Jerry Krebbs, features like these mean that it takes the average user about eight hours to learn Savvy's primary commands. "I'm talking about people with no computer background, who don't know programming." However, he adds, "The Savvy system has the same limitations as any system. When you get into the area where people write their own software, some people's solution sets don't necessarily lead to the correct answer. By experience, they'll acquire a feel for that, and they'll also learn that they cannot program a computer to do what they cannot do themselves. But the main difference between Savvy and other programming languages is the development time. For instance, I used BASIC to create a little file-management program. I can write a BASIC program to keep track of names and addresses and sort them, and I can probably create a bug-free package in five hours or so. I can do the same thing in minutes in Savvy."

The Savvy manual includes about 90 pages discussing Savvy commands and how to use them. In addition, it contains a large pamphlet entitled "A Guided Tour to Savvy," designed to give newcomers to programming a general understanding of how Savvy works. The "Guided Tour" takes the user step by step through the construction of a loan amortization program, explaining why the program works. Nels Winkless, director of corporate communications for Excalibur, explains that Savvy is written in language that can almost be understood in and of itself. "You really can take a guided tour of it; go wander around and look at it; get a sense of what it's about and what you're striving for; and, most importantly, get a feel for what something that works looks like," Winkless says.

People can be analytical or intuitive, Winkless says, "The intuitive types could not have invented the machines or developed them," he explains, " but they sure as hell want to use them, because the machines have become everyday tools. The traditional educational route has been strictly analytical—you sit down and you get a little bit of an introduction and they say 'Here is what we are going to accomplish.' First you learn these rules, and then you sit there and work through those rules. When you get around to trying an exercise, if you can remember the rules then good for you. From the point of view of an analyst, of course you can remember—you were there when we explained it. You work through and you follow the standard logical process of building up bigger things from little chunks and so forth. Well, there's a great deal of virtue to that, but it certainly impedes learning to use a computer for anyone not inclined to work on a rule-driven system."

Any article that attempts to cover a field as broad as programming languages must, of necessity, be somewhat incomplete. Among the languages available for personal computers that we've neglected here are (in alphabetical order): ADA, APL, C, COBOL, FORTRAN, Lisp, and Pilot. What we've attempted is to provide a good sampling of languages for the beginning programmer (BASIC, Logo, and Savvy), describe a few of the more commonly implemented languages for business applications (FORTH and Pascal), and more than anything, provide the information you need to decide whether you want to learn to program and, if so, how to do it.

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Big Deal For Small Business

WORD PROCESSING: A GUIDE FOR SMALL BUSINESS
BRIAN R. SMITH, DANIEL J. AUSTIN
LEWIS PUBLISHING CO. (STEPHEN GREENE PRESS)
BRATTLEBORO, VT
200 pp., $9.95 paperback

It is disheartening to discover how many people seem to equate "small business" with "small mind" or "small education." It seems reasonable to assume that a small business operator interested in purchasing this or a similarly titled book would not be a total stranger either to computers or word processing. The thinking of such a prospective purchaser logically would be: "I know a little about computers. I know one of the things they can do is word processing. What can computers and word processing do for my business?" The very title and subtitle of this book suggest that answers to those questions will be provided. Indeed, the book eventually does provide such answers, and does so fairly well. But first, the reader is stuck with the author's assumption that he is both ignorant of, and particularly interested in, the history of word processing. The reader must plow through 61 pages—better than a third of the book—of definitions, explanations, discussions of the uses of such intricate machines as copiers and computers, pictures of pretty girls in front of pretty machines, and even a discussion of "typewritters" (sic).

To be sure, the first section does include some useful charts and graphs of cost comparisons, but it also has some charts showing the recent and projected differences in the makeup of the work force—things like white collar vs. blue collar workers, how many people are working on farms, how many are working in "craft & kindred," and similar data. Who cares? What the small businessperson really cares about are the ways in which word processing can be applied to his particular venture.

Eventually, in Chapter 5, we get this information. The chapter is entitled "Typical Applications," and lives up to its promise. It shows how standard letters can be done more quickly and economically with a word processor, how the system can be used for financial information, for recording performance data, for mailing operations, various and sundry files, data for the purchasing department, etc.

This book also contains excellent material on performing an evaluation study prior to purchasing a word-processing system. This could have been the best part of the book. It shows how to compare different types of systems and includes various criteria for making economic decisions. However, the authors spend an incredible five-and-a-half pages discussing the capabilities of "hard-wired" word-processing programs and less than a page on software packages. During the past year or so I have dealt, directly or indirectly, with a wide variety of consultants, seminars, workshops, and printed material, all bent on advising executives and entrepreneurs on how to go about acquiring a small computer system. The current consensus is to: (1) determine what your needs are; (2) determine what software is already available to best satisfy those needs; and (3) buy the computer that, within the constraints of your budget, will best run the software you need to meet your requirements. If that is the gospel, then either the authors of this book know something that everybody else doesn't, or all of these experts are simply not talking to each other. In any case, the almost total absence of a comprehensive discussion of word-processing software in a book about word processing certainly raises the question of whether that book is in fact the definitive work on the subject.

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processing can be applied to their businesses, and who can use some extremely well-planned guides for evaluation and cost analysis, will gain much from *Word Processing: A Guide for Small Business*. Anyone looking for solid information about the pros and cons of word processing, and whether to get a "hard-wired" word processor or a personal computer that does word processing, had probably best look elsewhere.
—*Marvin Grosswirth*

The Delicatessen Approach To Programming

SUBROUTINE SANDWICH
DR. JOHN P. GRILLO AND DR. J.D. ROBERTSON
JOHN WILEY & SONS INC.
NEW YORK, NY
251 pp., $12.95

I'm tempted to say that the best feature of this book is the delightful photograph of a deli sandwich on the front cover. I had to put my review on hold until I raided the refrigerator to make my own version. Now I can report that both my deli sandwich and the authors' "subroutine sandwich" satisfied my particular needs, albeit in two totally different areas. I recommend sitting at your computer with a real sandwich on one side and this book on the other, if only because I think you'll be busy for quite some time and need the sustenance.

The authors have written some 36 BASIC subroutines that can be incorporated easily into your own programs. They are the filling for your own "program sandwiches." And satisfying fillings they are, too. After a brief section on structured programming and how to use the book, the authors get down to business with subroutines for data and word processing. Using those routines, it's a simple matter, I've found, to write programs for handling the generation of form letters and reminder notes.

Subsequent chapters become a bit more mathematical, with routines for base conversions, statistics, table management, and sorts. One chapter is devoted to interest calculations—not much new here, I'm afraid. Another chapter has some simple plotting routines. The final section of the book describes five programs that use some of the authors' subroutines. That's helpful for the structuring of your own programs. However, the sample programs had an academic flavor to them, as though they had been used as classroom exercises. That's understandable, since the authors are both college professors. Nevertheless, I would have preferred more practical examples.

The routines are written in BASIC for the Radio Shack TRS-80, but they can be run on almost any computer using the popular Microsoft BASIC. The authors also show how to adapt their routines for the Apple II. But why aren't these programs available from the book publisher on accompanying disks or tapes?

Two significant subroutine classes are missing from this book—data-entry routines and output-formatting routines, both essential for business data processing. This omission reemphasizes the authors' academic preoccupations. However, the home-computer user will still find much that's useful in the book. While *Sub-*

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BOOK REVIEWS

routine Sandwich cannot qualify as a full-course programming dinner, it does provide enough nourishment to keep you going for a long time.
—*Jeffrey Bairstow*

Pure And Simple BASIC

TRS-80 EXTENDED COLOR BASIC
RICHARD HASKELL
PRENTICE-HALL INC.
ENGLEWOOD CLIFFS, NJ
170 pp., $12.95 paperback

Richard Haskell has written a very straightforward, pure and simple book about programming in BASIC for people who own or have access to a TRS-80 Color Computer.

Mercifully, the book does not begin with a history of personal computing or the story of the Tandy Corporation or where the TRS-80 Color Computer fits into the spectrum of Radio Shack products.

Inasmuch as Professor Haskell has spared the reader the preliminary tedium that accompanies so many books of this sort, I can do no less, and will spare you the tedium of a chapter-by-chapter analysis. This review will be as pure and simple as Professor Haskell's book.

If you have access to the machine, sooner or later you are going to want to program it. In order to do that, you will have to learn Extended Color BASIC. This book shows you how. It does so in easy progressions, in simple language, and with enough illustrations so that you can check your screen against the pictures in the book to see if you and the good professor are on the same track.

My one minor objection to this book is its rather simple, almost boring style. In his preface, the author points out that this is intended either as a self-help book or as a text for students at the high school, junior college, or university level. I think a

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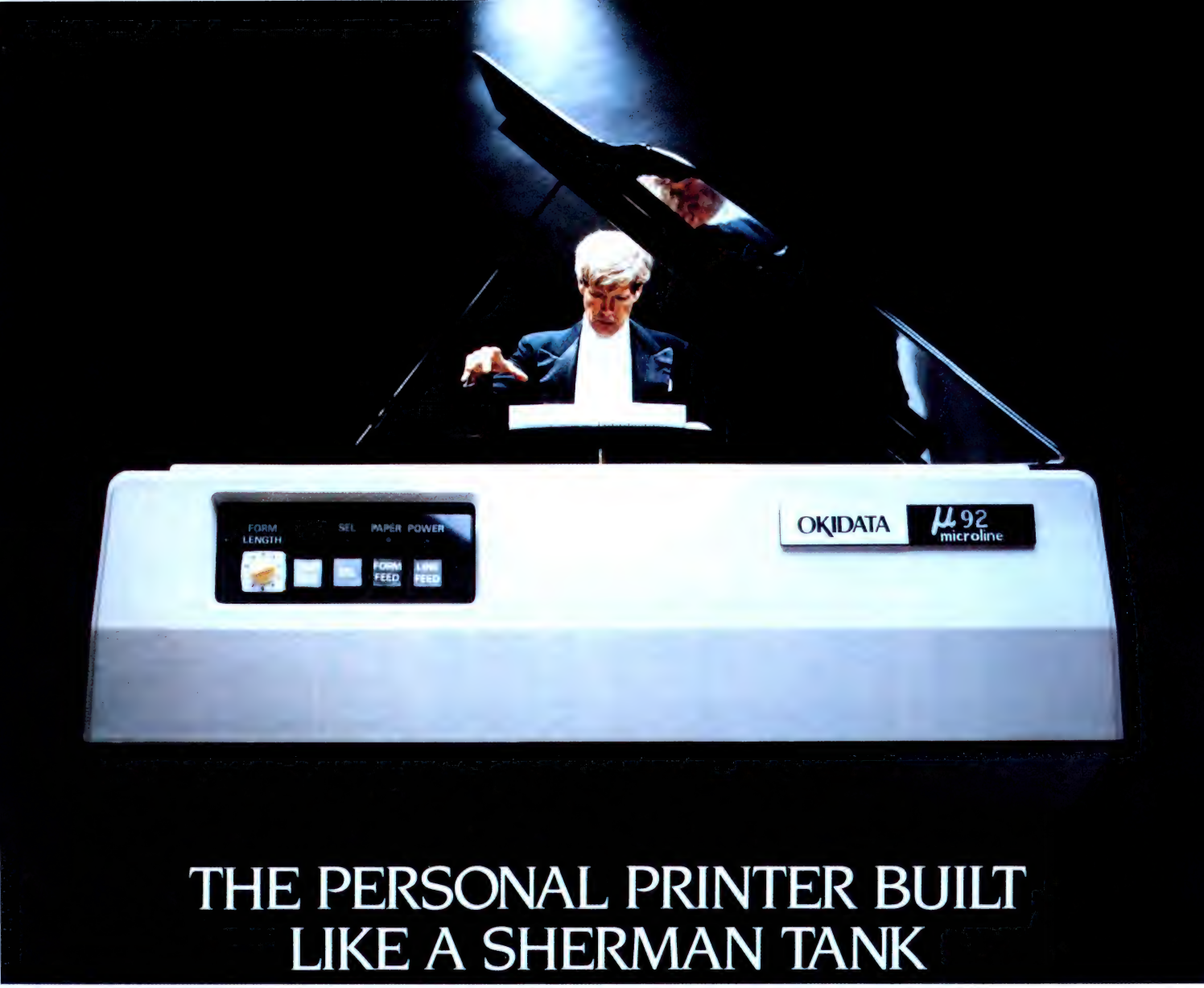

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bright junior high student would have no difficulty at all dealing with this book, while a somewhat more sophisticated scholar might find the language and treatment a touch tedious.

Never mind. As we have asked previously: Did you come to read literature or to learn programming? If the latter, and if you want to do it on a TRS-80 Color Computer, get this book.

—*Marvin Grosswirth*

Computer Knowledge For The Enthusiast

THE COMPUTER COOKBOOK
WILLIAM BATES
PRENTICE-HALL INC.
ENGLEWOOD CLIFFS, NJ
330 pp., $12.95

William Bates's *The Computer Cookbook* is the kind of book you have to admire if only for the sheer volume of work that has clearly gone into it. In more than 300 pages of densely packed typescript, the author has compiled an alphabetical source book that covers almost everything from Ada (both the programming language and the assistant to computing pioneer Charles Babbage) to Z80 assembly language subroutines. And, for the most part, the author covers the wide range of topics remarkably well.

The book is more of a computer version of "The Whole Earth Catalog" than a cookbook with recipes for using your personal computer. The book's subtitle, "How To Create Small Computer Systems That Work For You," might give the impression that this is a book for the novice. Not so. A newcomer to personal computing would be overwhelmed by the profusion of detail in *The Computer Cookbook*. This is a book for the moderately experienced user to

(continued on page 148)

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Smartmodem 1200	699	509
Smartmodem 1200B	599	419
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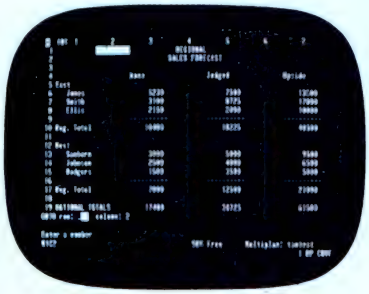

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CIRCLE 49

(continued from page 145)

browse through or use as a reference when the manuals and conventional programming books fail to provide the information he's looking for.

Topics are arranged alphabetically, and subtopics are grouped fairly logically within each major area. For example, almost six pages are devoted to hand-held computers. After a brief introduction to the topic, there's a list of companies who make hand-helds and a description of each product. The section ends with the author's predictions about the future of hand-held units. The choice of topics clearly reflects the author's professional interests (he's involved with the Video Group at Time Inc.), but within his selections he covers the ground comprehensively, if in a somewhat telegraphic style.

The book has a useful index that includes both major topics and subsections. That's important, because this is the kind of book where a fast browse will give the reader clues to information that could be useful at a later date. A good index is a necessary component of a book that is to be used for frequent reference. *The Computer Cookbook* will certainly find a place on the "heavy usage" bookshelf just above my desk and will be referred to often.

The book also has a good section on on-line services, and there are frequent references in other parts of the book to video text and bulletin board systems.

My only major complaint is that the book is not typeset and so is often hard to read. The text has been typed by a daisywheel printer using a font called "OCR-B." While this is well-suited to optical character recognition by machine, the typescript pages become hard on human eyes after more than a few minutes of reading. I urge the author and publisher to investigate an automated typesetting service for the next edition. This should be feasible, since the text has clearly been prepared with a

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CIRCLE 51

BOOK REVIEWS

personal computer. The text of the book and recent updates are also available on NewsNet, the electronic newsletter subscription service.

This book has been revised yearly since its 1979 publication. Mr. Bates, in your next update you might note that Radio Shack's word-processing package is called SCRIPSIT and not SCRIPTSIT—you got it right in your index but wrong throughout your text. I had a few other minor quibbles, but they are far outweighed by the overall value of this excellent "cookbook."

—Jeffrey Bairstow

Graphic Lessons

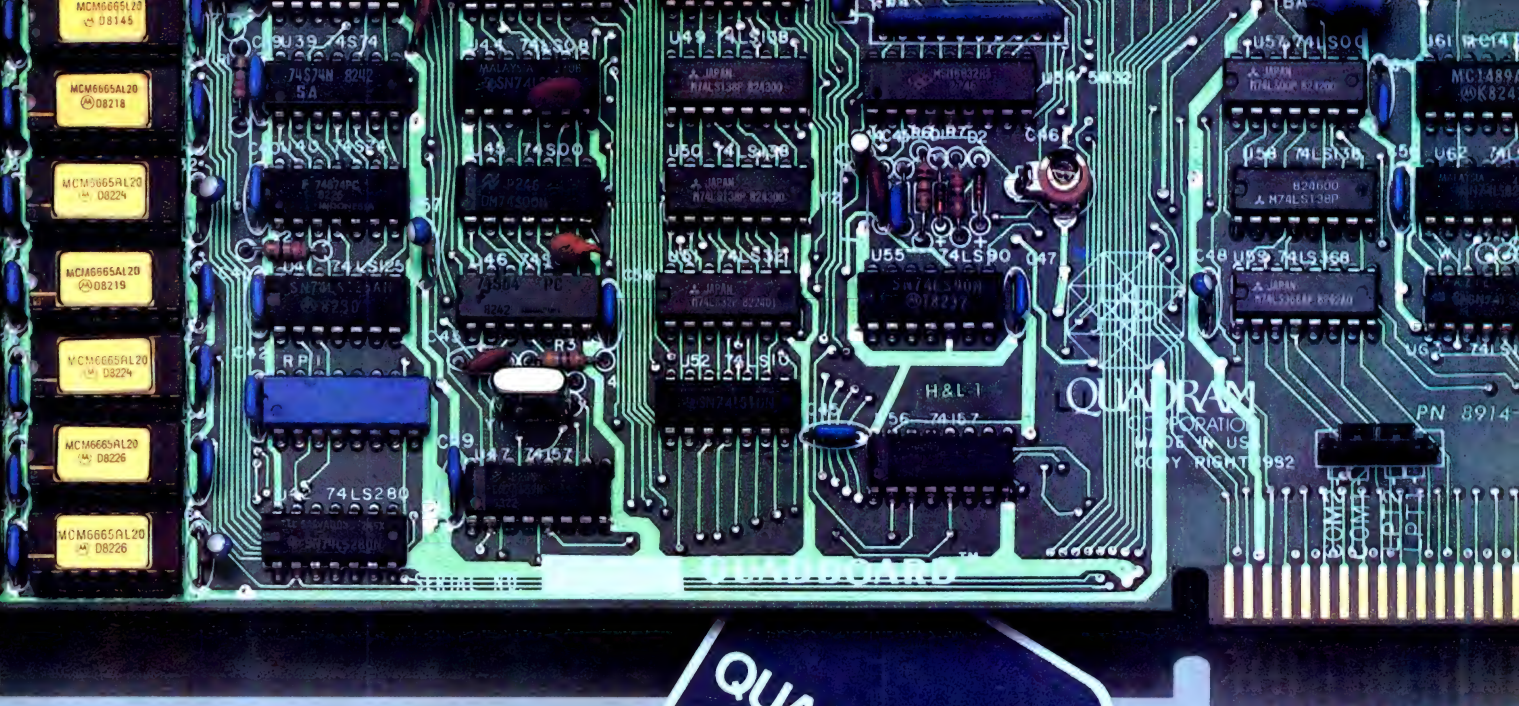
COMPUTER GRAPHICS
ROY A. HARTMAN, LOUIS VROOMAN, ROBERT A. WILKE, AND WILLIAM A. ZAGGLE
CREATIVE PUBLISHING COMPANY
COLLEGE STATION, TX
99 pp., $4.75 paperback

If you should happen to pick up this book at a bookstore, a computer store, or—as is most likely—the local college store, and it begins to fall apart in your hands, don't panic. It is supposed to do that.

This loosely bound volume actually consists of 99 removable pages, each of which is intended to be a self-contained lesson in computer graphics. In addition to being readily removable, the pages are punched for easy insertion in a three-ring binder.

In short, this is a workbook. A page at a time, a lesson at a time, an exercise at a time, it takes you through all of the phases of computer graphics, from two-dimensional to three-dimensional, including information about various kinds of hardware and applications, CAD/CAM, etc. The reverse sides of many of the pages contain appropriate graph-paper patterns (which, it may surprise you to

(continued on page 154)



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Plus there's Qspool. The program that lets you turn your memory into a print buffer. Choose from 8K to 56K of buffer space. And compute while you print. No more waiting.

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CIRCLE 54

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Smartmodem 1200B also features an automatic speed selector, that detects incoming transmission speeds. Along with screen displays to show you its current operating status. And, unlike some 1200 baud modems, Smartmodem 1200B operates at full or half duplex, for compatibility with most time-sharing systems.

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you need to "set up" your computer to match the way the remote system transmits data. With Smartcom II, you do this only once. After that, parameters are stored in a directory on Smartcom II. Calling or answering a system listed in the directory requires just a few quick keystrokes.

You can store lengthy log-on sequences the same way. Press one key, and Smartcom II automatically connects you to a utility or information service.

And if you need it, there's always "help." One of several special functions assigned to your IBM function keys, this feature explains prompts, messages, etc. to make communicating even easier.

Smartcom II also provides a directory of the files stored on your disk. Letting you create, display, list, name, re-name or erase any file right from the screen.

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NOTE: The Smartmodem 1200B may also be installed in the IBM Personal Computer XT or the Expansion Unit.

In those units, another board installed in the slot to the immediate right of the Smartmodem 1200B may not clear the modem; also, the brackets may not fit properly. If this occurs, the slot to the right of the modem should be left empty.

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CIRCLE 20

COMING IN FUTURE ISSUES

Different Machines, Same Data

Managers and businessmen who authorize expanded computer use by employees face a fundamental question: Must all workers use the same type of computer? The answer is: No. Dissimilar machines can exchange the same data. Learn how it's done in the September issue of *Personal Computing.*

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CIRCLE 56

BOOK REVIEWS

(continued from page 150)

discover, can consist of something more than just a lot of little boxes; some, for example, consist of a lot of little triangles; others already look three-dimensional without your having to do a thing to them).

The sheets are formatted so that there is provision for the student's name, file, section, date, and alas, even a grade. Why all of that is necessary on the first several pages, which, of course, discuss the various kinds of systems available, a history of microcomputers, and a history of computer graphics, is a trifle uncertain. The page on "Computer Anatomy" tests the reader/student's ability, as well as endurance, with such questions as "What is meant by computer architecture? What three components are normally found in a CPU? What is the main function of the controlling circuits?"

If you can maintain sufficient control over your own mental circuits to persevere, you will eventually move beyond the sections on software, languages, and input and memory devices. Finally, on page 17 (not to be confused, despite the layout, with lesson number 17, the first lesson starts on page 3), you actually get to run a program. From there on, the workbook is off and running. Arithmetic operations and flowcharting follow hard behind, as do first programs and subprograms. Page by page, lesson by lesson, the reader gets deeply involved with the fascinating, far from simple, but eminently useful applications of computer graphics.

It should be noted that, unlike some other books dealing with graphics, this one leans very heavily toward engineering and scientific applications. (The authors are described as being with the Engineering Design Graphics Department of Texas A&M University. In fact, they may *be* the Engineering Design Graphics Department of Texas A&M University.) While a clever student could no doubt make the necessary transitions

from these technical applications to more business-oriented uses, that would seem to be an unnecessary hardship, given the wealth of material available for business graphics.

Thus, for the engineer, architect, scientist, and others interested in developing some expertise in computer graphics for their business or profession, this workbook is an excellent way to plunge in. It would also make a fine supplement to a computer graphics course. In fact, it can turn an instructor and a student into one and the same.

—*Marvin Grosswirth*

Uncovering A Mystery

YOUR TIMEX/SINCLAIR 1000 AND ZX81
DOUGLAS HERGERT
SYBEX INC.
BERKELEY, CA
159 pp., $6.95 paperback

In this book, Douglas Hergert claims that the manual for the Timex/Sinclair 1000 is a mystery to the uninitiated. Now I'm no apologist for manufacturers' manuals, but the Timex volume isn't bad for its kind and can be used by the complete novice. The function of a book on a specific computer should not be to repeat the manual, but to compensate for its deficiencies. Unfortunately, more than half of Hergert's book simply covers ground that is already adequately described in the owner's manual.

The rest of the book includes a short course in BASIC for the Timex, a chapter on using the computer for numerical calculations, and a chapter on strings and string functions. While these chapters do add to the coverage of the same topics in the Timex manual, they barely justify buying this slim volume.

—*Jeffrey Bairstow*

COMING IN FUTURE ISSUES

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Salesmen or not, we all have selling to do. You might need to sell your boss on a new concept, budget, or staffing plan. An effective presentation is crucial, and a personal computer system can help. The September issue of *Personal Computing* explains how a computer can help deliver persuasive support.

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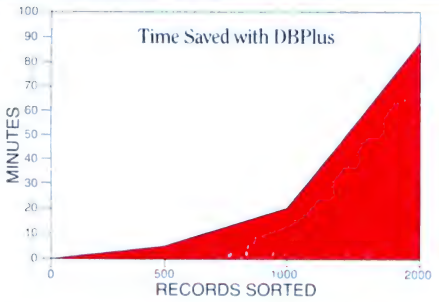

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CIRCLE 58

BODY MANAGEMENT

(continued from page 71)

"We're interested in maximizing the performance of athletes involved in sports like mine," he explains. "We take a high-speed film of the athlete and digitize it—that is, project it onto a tablet which is like an electronic piece of graph paper over which you can locate a cursor on a particular point and press a button. We take this data and run it through various programs, such as velocity programs, and then make recommendations to the athlete based on that."

This may sound a little too involved for the average person, Jansen admits, but it can be done "if you have enough expertise and want to buy a small digitizing tablet. I know of one that goes for $400 to $500." It may be worth it if you're a serious athlete, suggests Jansen. He himself has cut his racewalking time significantly. "Last fall, we took high-speed film, digitized it, crunched the numbers, and came up with the fact that I was carrying my arms too high," Jansen explains. "So I called my coach at Penn State and he said, 'Try lowering your arms, but at the same time, do this with your hips, and be careful about this, that, and the other thing.' So I tried it and practiced for about a month or two—and I cut three minutes off my 25km time," he says.

What the future holds

Jansen says we're only beginning to explore the use of computers in improving athletic performance. "I don't think the day will come when you'll see the computer as coach, but I do think it will provide support for the coach."

DINE system developer Darwin Dennison hopes for similar strides in the nutrition area. He's already planning a program for Apple's LISA computer with "graphics so perfect that it'll just show you the foods instead of putting in food codes. It will be the ultimate in nutritional capability in terms of analyzing diets."

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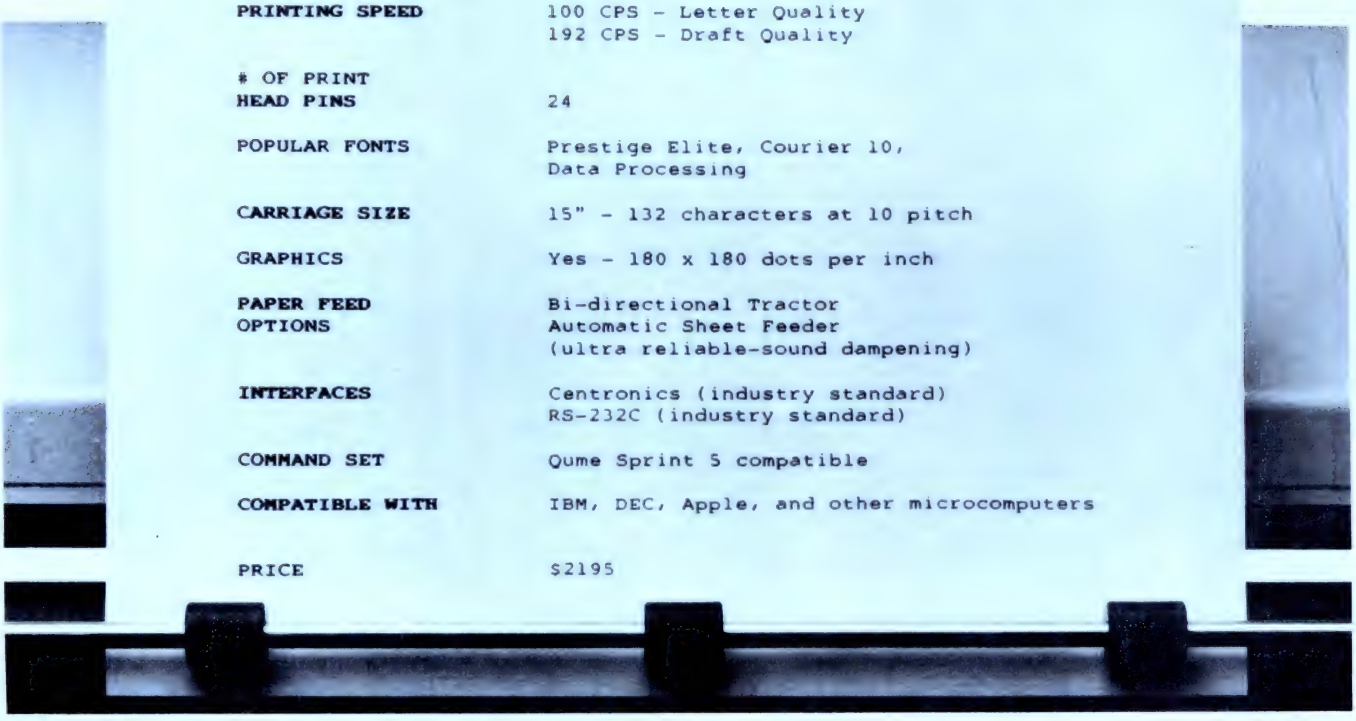

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CIRCLE 59

"The astonishing thing is how simple it is to train someone to use it."

INTEGRATED PACKAGES

(continued from page 78)

as on the capabilities of the computer itself. Lisa is equipped with a 32-bit microprocessor, about 1 Mbyte of memory, and a hard disk, so it provides a lot of power and potential to be exploited by software manufacturers. Products such as VisiOn or DesQ might be able to simulate most of the features of Lisa's user-interface on an IBM Personal Computer, and products like Lotus 1-2-3 or Context MBA can provide IBM users with sophisticated programs incorporating multiple applications, but nothing will provide that degree of integration for computers based on 8-bit microprocessors such as the Apple II, Apple III, or any of the Z80-based CP/M computers. However, users of 8-bit computers haven't been left totally out in the cold when it comes to applications integration. Many software series feature common command structures and file formats. Most of them include data-base management, word-processing, and spreadsheet modules, and some have several additional modules available.

A few integrated programs have also begun to appear for 8-bit machines. One is The Incredible Jack (Business Solutions Inc., Kings Park, N.Y.) for the Apple II. This program includes a word processor, data-base storage, and automatic calculator functions. The word processor is the main feature of the program, but the other functions can be useful for form letter generation, since you use the data base to insert information such as an address or even an entire paragraph; and calculator functions, to determine items such as the amount of commission a salesman has earned. Norman Hecht, president of Information & Analysis, a television research firm headquartered in Hicksville, N.Y., has equipped several members of his staff with The Incredible Jack. "I wanted a simple filing and word-processing system," he says. "We tried using VisiDex to keep track of phone messages, but the problem with that was that it had no word-processing capabilities; it was just a filer." He finds the program more than adequate for the kind of word processing done by his staff of analysts, and says, "The astonishing thing is how easy it is to train someone to use it. Anyone who has studied the tutorial can train people very quickly."

MicroPro International Corporation of San Rafael, Calif., has just released StarBurst, the first operating environment for the Apple II. StarBurst differs from the operating environments available for the IBM Personal Computer because instead of holding several programs in memory at once and transferring data between them automatically, it uses a systems integrator that links together all the steps necessary to complete a given task. The first time you use the program, you enter the sequence of activities necessary to complete a task you specify.

Selecting an integrated package

Another alternative for Apple II users is a product called Savvy, manufactured by Excalibur Technologies Corporation of Albuquerque, N. Mex. Savvy is both an operating environment and an intelligent programming language. Nels Winkless, director of corporate communications for Excalibur, explains that "integration is inherent in Savvy on an absolutely fundamental level, because the applications are not really distinguished from the language. When you write a program and name it, the name becomes part of the primary vocabulary, and so the application itself becomes part of the language." Among the applications included with Savvy are accounting, mailing list, and data-base programs. Excalibur has also announced that word-processing and telecommunications programs will be supplied with the Savvy applications package within the next several months.

Comments from users of integrated applications packages indicate that these products fill a very real need. It's also apparent that there are many options available to you if you decide to pursue integrated applications, and that there are many factors to consider in deciding which route to take. One is price. As we said earlier, Apple's Lisa will probably cost you about $10,000. Individual modules in the PFS series, on the other hand, are generally available for less than $200. They don't provide anywhere near the same level of integration that Lisa does, but they are an alternative.

Another factor is your present computer system, or lack of one. If you're buying your first system, you're free to choose the approach that fits your needs and your budget. However, if you're already using a personal computer, you probably will want to go with an approach that is compatible with your present system.

A third factor to consider is your present investment in software. If you own several thousand dollars worth of applications packages, and have invested hundreds of hours in creating data files with them, buying an operating environment that allows you to use your present software may be a much more attractive alternative than starting over from scratch with a completely new system.

The final factor to consider actually encompasses all the others. That is, what do you need from an integrated applications package? It has to fit your budget and perhaps be compatible with your present hardware and software, but more than that, an integrated applications package should give you all the applications you need in the most convenient and easy-to-use format. Thus, before making any decisions, you should determine what applications you need to have within an integrated system, and what applications you might conceivably need in the future.

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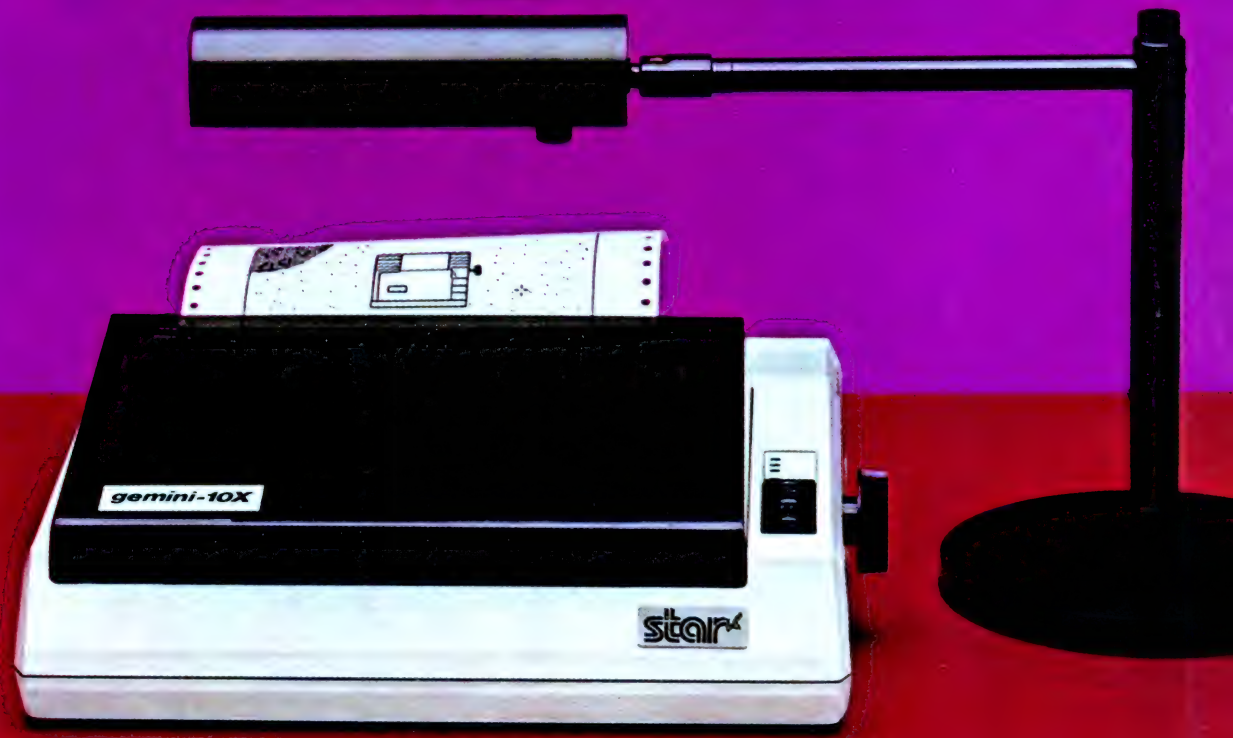

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COMPUTERPHOBIA

(continued from page 57)

there's been an emphasis on making the documentation (or user manual) as easy to understand as possible. Nevertheless, you may find that the documentation is leaving you stranded. Certain operations aren't accurately described; misprints lead you into mistakes even when you follow the manual exactly; there's no section that describes what to do in various error situations, and the error messages you get don't make any sense; or perhaps you don't understand some of the terms being used. Everyone who uses a computer runs into these problems at one time or another, but there are ways to avoid them.

Read the documentation carefully and thoroughly. Because they are digital devices, computers have very strict orders of operation. They are basically very rigid in that they only understand directions in very limited ways. Most people treat computer manuals like they treat any other manuals: They read a little, do a little, read a little, etc. This haphazard approach doesn't matter with most appliances, because the user can usually see an instant result from doing the wrong thing, and can figure out how to correct the problem from looking at the device. But you may not see the results of computer instructions until an entire command string has been given, and if the result is wrong, it's difficult to know which part of the command was incorrect. The only solution to this problem is to read the manual step by step, no matter how much the early pages seem to insult your intelligence, and no matter how long it seems to take. Novices who are offhand about reading it are asking for long hours of frustration.

Another big problem with documentation is that people take it too seriously. Many first-time users come upon their first foreign word, such as "Initialize," and stop right there. While it's fine to look up the definition of that word if the manual has a glossary, you shouldn't stop reading. Most of the time, you can figure out what the word means from its context. Similarly, you may come to a spot in the manual where the instructions are ambiguous, or something seems to be missing. The answer here is to try to work each operation as it's explained in the manual. Then, if it doesn't work, don't blame yourself and don't give up. There is an answer to problems of this type. It may require calling the computer dealer, or even the manufacturer of the computer or software to get an explanation, but it's important to remember that the answer does exist.

Users are often put off by error messages they get from the computer. A loud beep and a terse message can be unnerving, but these are the only ways the computer can point out an error. The messages are vague, but that's a matter of necessity. With a limited amount of memory space available for storing error messages, each message must be designed to cover a wide variety of error situations. Since you can't see your actual mistake, it's natural to want a specific description, but not getting one is a fact of life with personal computers. Many newer manuals include sections describing the various error messages the average user is likely to encounter.

The most important thing to remember about computerphobia is that it's a natural reaction to something unfamiliar. If you're trying to use a personal computer or are considering using one, remember: Allow yourself to be a little ignorant for a while. Plan to spend some time learning; give the computer a chance to prove itself before you decide you can't use it; take things a step at a time; make sure you read the documentation carefully; and finally, don't forget that *you're* in charge, not the computer.

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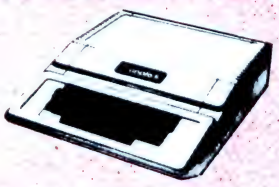

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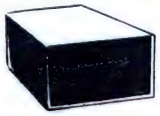

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CIRCLE 65

INVENTORY CONTROL

(continued from page 85)

ment report, for example, will show how many parts are in stock for all items or a specific range of items. It will tell how many are available, how many are allocated for production, and how many are on order. The Requirements Report prints a listing of parts by bill of material, showing how many parts are on hand, and how many are needed to produce the work already planned. A Work in Progress report shows how many jobs are underway, how many parts are allocated for them, and the dollar value of the work in progress.

Computer muscle

Although the inventory at MID Labs has grown to 700 items, it hasn't even begun to test the capabilities of the system, which has a capacity of 32,000 items. "We're very pleased with the program," says Solso. She projects that it would take four or five people to maintain the inventory data by hand as well as she does alone with the computer.

Solso has found Microcomputer Consultants "very helpful" with whatever problems she's encountered. Her only criticism of their product centers on the manual. "I thought it could have been better organized," she says. "Information about a single procedure was located in two or three different places." Still, she got the system running fairly quickly, and has had no problem with the updates the manufacturer has been supplying for free. "We're looking forward to the next update," she says, "because it has an interface with our general ledger."

But whether the computer inventory control system is integrated with other accounting software or not, the benefits of letting a computer do the work are clear. With a computer, you can change inventory control from a headache into a valuable planning tool that reduces waste and increases profits.

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CIRCLE 68

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CIRCLE 69

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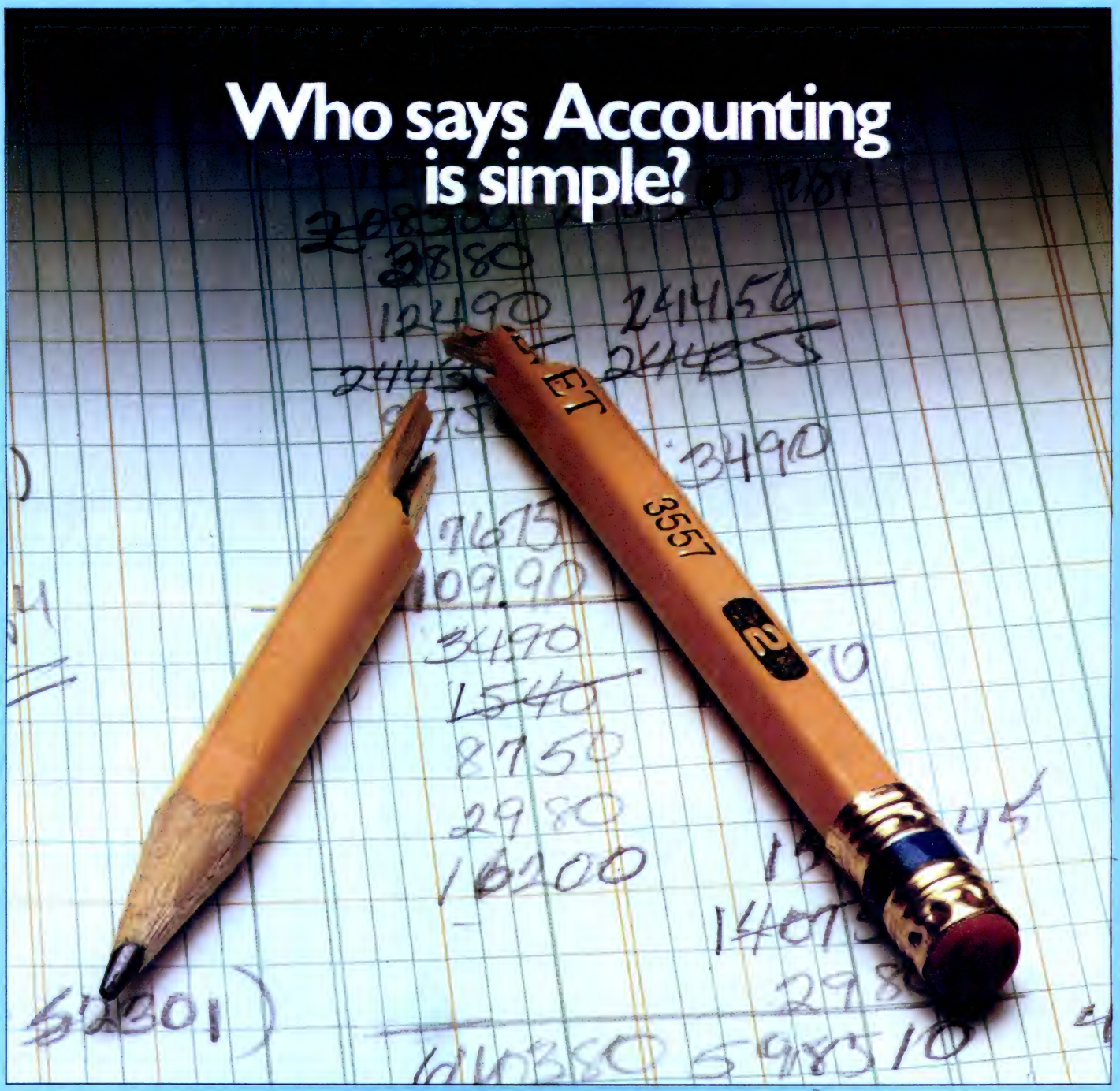

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INTEGRATED SYSTEM FEATURES
HUMAN INTERFACE

The Epson QX-10 Valdocs (Valuable document processing) package is probably one of the easiest professionally-oriented personal computer systems to use this side of Apple's Lisa. It hews to a single, powerful vision—ease of use—yet it costs no more than hardware-comparable systems.

The package includes the basic version of the QX-10 with 64k RAM, two 380k (formatted) disk drives, several hard disk options (from other manufacturers), a detachable keyboard with numerous function keys and a 10-key pad, five internal expansion slots, printer, modem and light pen ports, and a special 80 by 25 non-glare display that uses a special processor and memory. Like most 8-bit Z80 computers, the QX-10 boasts CP/M compatibility. Many CP/M-compatible computers can't run the more demanding packages due to memory/disk capacity limitations, among others. The Epson is ample in these areas; you can have your dealer load a large number of programs onto Epson-format disks and run them.

The Epson/Valdocs system runs CP/M software, but many owners will find the Valdocs software/hardware package does everything they need, especially if their uses center on word processing. This version of the Epson has 256k RAM, most of it devoted to the comprehensive Valdocs software. The design integrates a multifunction software package with an easy-to-use keyboard. Besides the normal typewriter layout and 10-key pad section, this keyboard is covered with several dozen dedicated function keys with plain English labels—and functions—like STOP, HELP, COPY DISK, UNDO, STORE, RETRIEVE, PRINT, INDEX, MAIL (using a modem and phone lines)—more than 24 function keys in all. And the 10-key pad includes a special key that gives decimal tabbing, to keep columns of numbers lined up on the decimal point.

The combination of the multifunction Valdocs software and the special keys enables the novice to compute like an expert after a few hours of puttering around with the system, and with little instruction. The system is so self-explanatory that it's hard to imagine why some other computer makers make it so hard to do the same things.

The Valdocs system uses a technique called virtual memory, where the file you're using resides mainly on disk, and is swapped in and out of RAM as needed. That way you can make and handle files right up to the size of the disk—up to the 10 Mbytes of characters a hard disk can hold. A possible problem in this technique is that it takes more time to access a disk than to access RAM.

The Epson QX-10 features 64k of RAM, two 380k disk drives, and a screen that can display 96 special graphics characters.

That means you don't have to worry whether the data's on disk or in memory—the computer finds it for you automatically. The Valdocs package doesn't make the QX-10 process data faster than other systems; in some ways it's appreciably slower, in fact. Fast typists will find their fingers getting ahead of what's on-screen, though the Epson never drops characters. Scrolling can be slower, too. But the software developer indicates that Epson is developing a software upgrade that will speed up the screen display considerably.

Even now, it's an economical implementation of a well-integrated computing concept. Computer fanatics may gripe about the slowness, but they're forgetting two things: (1) Valdocs is much faster than manual systems;

(2) Valdocs requires considerably less owner time investment in learning to use the system.

Valdocs integrates most of the functions many need in a computer: an advanced level of word processing; disk drive and printer handling; four-function calculation with columns of figures lined up on the decimal points of numbers (decimal tabbing); telecomputing, including electronic mail; and substantial graphics-generating ability.

Part of what makes the Epson QX-10 so simple to learn is that what you see is really what you get. The screen can display normal, inverse, boldface, italic, and boldface italic characters—all mixed on the same line, if need be. But that's not all. Some 96 special graphics characters can also be displayed along with everything else. They include symbols useful in scientific, literary, and artistic endeavors. Later software upgrades will add underlining, superscript, subscript—maybe more. Two keys on the Valdocs keyboard let you determine type size and style for additional type fonts. These have not been implemented yet in the software.

The Epson has a level of display formerly associated only with 16-bit computers costing well over $5000. This level of display is possible because the Epson CPU includes a special NEC 7220 graphic processor that works with an additional, dedicated 128k RAM. The NEC coprocessor and the RAM maintain a bit-mapped, incredibly sharp, 640 by 400 pixel display. For further refinement, a light pen is coming. (A plug for one is already built into the Epson's back plane.)

The first time we started up the machine we slid the Valdocs diskette into the left-hand drive and a data disk into the right-hand drive. (One data disk comes with the computer.) We turned the machine on, and the Valdocs software booted quickly. Had the machine already been on we could have booted it by pushing the RESET button under drive B. There's no tutorial included. Rather, the QX-10 manual tells you, in a few pages, how to handle the hardware, and the Valdocs manual suggests you just fool around with it, using the function keys as your map.

We started very simply. We knew we wanted a copy of the Valdocs disk for backup. So we hit the COPY DISK key and followed the instructions. Then we went to write something, and when we needed an editing instruction we hit HELP. When we did something that gave us poor results, we hit UNDO to take us back where we were. When we wanted to save a file we hit STORE. To get it back, we hit RETRIEVE. The display always showed us where we were in the text, along with a time display, margins, and tabs. By the way—you change tabs just as you would on a typewriter, using the same keys: TAB SET and TAB REL. Overall, we found Valdocs provided a sophisticated word processor whose more refined functions could be used or not as needed. Everything is both menu driven and accessible by direct command. And it really does beggar the word "friendly." We turned the computer off in the middle of working on a file. When we turned it back on, it booted Valdocs, loaded the file we'd been working on, and put the cursor exactly where it had been when we turned the machine off.

The other functions tie right in as well. Hit the MAIL key and you communicate with other computers through the phone lines (or with connecting cables)—if you've bought and installed a modem. Comrex International has announced a 300-baud modem that will fit into one of the Epson's five expansion slots. The built-in RS-232-C port makes connecting a wide variety of other modems possible, too. We didn't have a modem in our demonstration unit, but the software was in place. It provides for a true electronic mail setup, with "mailboxes," unattended transmission, and more.

The Epson QX-10, with Valdocs with two drives and display, lists for $2995. An Epson FX-80 printer would add $695 to that, and the system will implement an FX-80 (or other Epson printer) with no special configuration by the user.

FOR MORE INFORMATION: EPSON AMERICA INC., 3415 Kashiwa Street, Torrance, CA 90505, (213) 539-9140.

—Lee Thé, Associate Editor

CIRCLE 660

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CIRCLE 36

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image printing. In the first mode, 96 alphanumeric and 64 mosaic graphic elements can be combined to create complex images. These images can be specified by commands—you don't need a color CRT. Text characters print in a 12 by 16 dot matrix, and graphics symbols in up to a 12 by 20 matrix. Text and graphics can intermix—even on the same line.

In the bit-mapped image mode you can dump any screen image to hard copy. Actually, the Diablo can print a 120-dots-per-inch image—sharper than that of a personal computer's CRT. Even state-of-the-art machines like Apple's Lisa can't match the Diablo's image density. The printer produces seven colors in five levels of halftone, to give you subtle shadings far beyond plotter capabilities. Moreover, the colors are available in text mode as well as graphics—you can print any combination of foreground and background colors with simple ASCII commands delivered through your computer.

The Diablo's ink jet design lets you print onto transparencies as well as paper. It has provision for roll paper or single sheet, and can run fanfold (though without tractor feed). A roll paper feeder can easily be installed on the back of the printer. The paper can be either plain or clay coated. Some types of paper aren't absorbent enough to work with the ink jet system, so Diablo is publishing a list of approved, widely available papers.

Beyond its splendid printing abilities, the Diablo has other virtues. Considering what it does, this printer is quite fast. Its 20 cps in text mode (about 200 wpm) matches the speed of an intermediate letter-quality printer—far slower than a dot-matrix. But the Diablo produces all its graphics at the same speed, a feature which few other graphics hard-copy printers (especially plotters) can match. Moreover, no other dot-matrix or daisywheel printer, or printer/plotter, is as quiet. Diablo claims well under 55 dBA. When you compare that to other printer figures, remember that the dBA scale is non-linear—a few decibels can represent substantially higher noise levels. (The unit we saw demonstrated just murmured to itself as it printed.) If noise level is a critical concern, this printer might be worth getting, even if you didn't exploit its graphic qualities.

The Diablo's low-maintenance design will also win friends. In the past, ink jet printers have sometimes had problems with clogging in the little jet nozzles, and with ink refilling. Not so with the Diablo. When the 16-nozzle (four-color) print head hasn't been used for five minutes, it automatically slides to a maintenance position at the left side of the platen. It also goes to this position when you power down.

In the maintenance station, the print head presses against a flange that seals the nozzles in a fluid-saturated atmosphere. This keeps the ink from drying in the nozzles. The printer also prevents ink buildup by automatically blowing out the nozzles each time you turn on the power. The excess ink helps replenish the maintenance station's fluid reservoir, and you don't get blobs of ink when you start to print.

All you need to do to maintain the print head is swab it with a wet Q-Tip once a week. The maintenance station reservoir needs to be refilled, but only rarely. You slide out the platen and remove the maintenance station, filling it from the side. It takes only a few minutes to do. To store the printer, you move the print head to a storage station to the right of the platen and empty the maintenance station of its fluid. The printer can stay that way for months.

The front of the printer has separate LEDs to show when paper or any one of the four ink cartridges is low. The ink cartridges are shape-coordinated by ink color, so you can't accidentally put a cartridge in the wrong color position, or put it in the wrong way. When you push the cartridge down into place it breaks a seal and opens the connection with the print head. Your fingers never come in contact with the ink. The water-based ink dries in less than a second, preventing smearing or the need for special handling of freshly printed output. Each cartridge is good for about 250,000 characters.

The printer looks a lot like a dot-matrix printer. At 6 by 14 by 21 inches, and 24 lbs., it's not very large. Besides the warning LEDs, the front panel includes power and ready lights, along with switches for power, pause and feed, and test/ink purge/print modes. The Diablo connects to your computer via a box-stock Centronics-type parallel connector. There's hardly a computer made that couldn't connect to this printer.

When you take off the top panel and look at the print mechanism you can see why it promises to be so reliable. The low mass print head just slides smoothly from one side to the other as it prints (bidirectionally or unidirectionally). The only other motion you see is the rotation of the friction-feed platen. The print head never touches the paper, and its ink jet nozzles are actuated by piezoelectric crystals. There's no vibration, no clatter, no impact. Diablo claims a 5-year design life for the machine, and service can be handled by your dealer or by the Xerox Service Network, which provides depot and on-site service from over 90 locations around the country.

You may have a wait for implementing software. Fortunately, the Diablo can emulate a normal printer in its text mode, and it will work with print spoolers just like any other printer. If your applications software provides for direct printer addressing, you can command both text and mosaic graphics generation. For instance, Hayden PIE Writer, a word processor for the Apple and IBM Personal Computers, allows for this kind of direct printer address.

But what's most needed is screen dump software, so you

can get hard copy from screen images. This could give you presentation materials beyond the normal pie charts and bar graphs. Diablo says screen dump software is coming soon from independent vendors working with Diablo. The software packages will work with computers running operating systems like CP/M, MS-DOS, Apple DOS, UNIX, and the P-System. You may still have to look around—or wait—for graphics application packages that fully exploit the Diablo. Often software firms will write a software module, called a driver, that can be added to your present package. Check your software manufacturer to see how likely and how soon such a driver will be forthcoming for the Diablo.

The Diablo Series C ink jet printer costs $1295. Diablo says it will be available in quantity by early September.

FOR MORE INFORMATION: DIABLO SYSTEMS INC. (a Xerox subsidiary) P.O. Box 5030, Fremont, CA 94538, (415) 786-5000.

CIRCLE 650

—Lee Thé, Associate Editor

BOARD TRIPLES THE SPEED OF APPLE II

Saturn Systems's Accelerator II board for the Apple II triples the speed of the Apple's processor, making an Apple/Accelerator II-based system potentially one of the fastest around—even against 16-bit machines. And you don't have to be a programmer to use it. The board can be installed in 30 seconds, and many applications programs can take advantage of the Accelerator II. Other programs may require a preboot disk.

Other accelerator cards are appearing on the market, and it's important to note many great differences—mainly in whether (and how much) RAM is included on the card. The Accelerator II contains a 3.6 MHz MOS Technology 6502C processor and 64k of on-board RAM. Saturn contends that the MOS Technology version of the 6502C runs cooler than other processors and the on-board RAM is necessary to get full benefit from the speed of the processor. It works, basically, by loading your applications program into its own RAM bank rather than the RAM on your machine's motherboard or on a language card. The motherboard 6502 becomes a coprocessor that handles the screen display (including graphics), and communications with timing-dependent peripherals—mainly modems and disk drives. All those operations have to take place at the motherboard 6502's 1 MHz clock speed. If you want to supercharge the whole system, think about getting a 1200-baud modem and a hard disk drive. The resulting computer would have few competitors at its price.

When you compare processor speeds, remember that the overall throughput depends on more than the number of cycles per second (clock speed). Different processors have widely varying instruction sets, so one processor might have a higher clock speed but a more rudimentary instruction set. The 6502 is known for having a very good instruction set, so that its throughput is a lot better than the clock speed alone would suggest. The best way to test the speed of a processor is to go to your dealer, and try out some software to see how fast it actually is.

Our demonstration unit was very fast indeed. It came with a 36-page manual including a three-page quick-start section. It's all written in plain English, an innovation we appreciated. Going to the quick-start section, we were instructed to find a bank of switches on the card, corresponding to the Apple's slots 4 to 7. It said to cock the switches corresponding to slots containing disk drives and modems—so the processor would run at "normal" (i.e., low) speed with those peripherals. When that was done, all we had to do was decide where to install the Accelerator II board. Other processor-bearing cards (like Microsoft's Softcard) must be placed to the right of the Accelerator II's slot, and your modem should run from any of the slots 4 to 7. We put it into slot 4.

A diskette comes with the board. You're instructed to make three copies of this disk to use as your set of preboots when you configure each copy. You run the "disable" disk to run things like CP/M software. The "Phantom 0" disk preboots Integer BASIC and Pascal programs, along with programs requiring a language card for program (vs. data) storage. Finally, the "Fast Applesoft" diskette preboots programs written in that language. Appendices of popular software tell you which category particular programs fall in, if you are in doubt.

The Saturn Systems's Accelerator II card costs $599, taking it out of the realm of "impulse purchase." But try to take a look at an Apple with an Accelerator II card before you trade in your old workhorse (and all its software) on a hot new machine. With this card, you just may find you already have it. The Apple IIe version is coming, by the way, and should be out by late summer. The current card runs on a IIe but will not support Apple's 80-column and extended memory functions.

FOR MORE INFORMATION: SATURN SYSTEMS, INC., 3990 Varsity Dr., Ann Arbor, MI 48104; (313) 973-8422.

CIRCLE 661

—Lee Thé, Associate Editor

SINGLE DEVICE WITH THREE COMMUNICATIONS FUNCTIONS

Complexx Systems has introduced the StationMate, a data communications system that combines a statistical multiplexer, an intelligent modem with automatic dialer, and a local area network interface—in a single device.

StationMate offers independent use of the three basic functions, as well as allowing all three to be used together in various configurations to create networks.

(continued on page 179)

Presenting Hyperion™, the world's most powerful, portable computer developed for the busy professional.

A Star is Borne

Star Light

Hyperion is a true portable, weighing in at only 18 pounds. It is light on the eyes with its European amber screen and styling. But heavy on performance with many standard features which are expensive necessities for other personal computers. And all for a price that's less than you'd expect.

Star Bright

Hyperion is bright. Communicating with the world is easy with our **integrated** voice and data package. Standard is our **256K RAM memory**, essential for the new generation of application programs.

Hyperion has the same processor, graphics and operating system as the IBM P.C. However, an improved keyboard ties the function keys to our screen soft keys. All this means Hyperion can run popular IBM software right off the shelf — Visi Calc†, Word Star†, Data Base II† and many, many others.

Hyperion is the rising star in personal computers. Catch a rising star today.

Standard Features

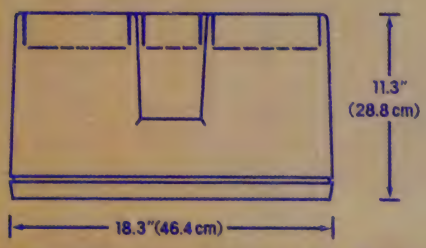
Processor	Intel 8088
Software	MS DOS
	Advanced Basic (Microsoft)
	Advanced User Interface*
Memory	256K User Ram*
Drives	5¼", 320K bytes, IBM compatible
	Virtual Ram Disk (Up to 160K)*
Display System	7" Non-glare amber
	Graphics — IBM PC compatible
	Full 80 x 25 character format
	Auto screen off for prolonged life
Serial Port	RS 232C*
	RS 423*
Parallel Port	Centronics/IBM compatible*
Other Features	Time and date clock with battery back-up*
	Additional video output for external monitor*

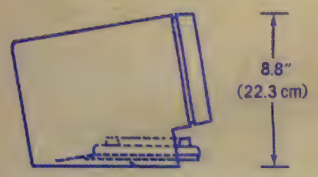
*These extras worth over $1000.

Optional Extras

Drive	Additional 5¼" 320K drive
Communication	IN:TOUCH telephone management system
	Built in 300 baud modem (103J)
	Direct connect
Acoustic Cups	Uses internal modem
Expansion Chassis	5 or 10 MB of hard disk
	Up to 7 slots for IBM compatible cards
Carrying Case	Attractive case with accessory pockets
Multiplan†	Hyperion enhanced
123†	Hyperion enhanced
IN:SCRIBE	Word processor

†Visi Calc is a trademark of Visicorp
†Word Star is a trademark of Micropro International Corp.
†Data Base II is a trademark of Ashton Tate
†Multiplan is a trademark of Microsoft Corp.
†123 is a trademark of Lotus Development Corp.





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The Bytec Group

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Europe: U.K. 04026 4926; Telex 894222

CIRCLE 111

Compute While You the Buffer that

MICROFAZER PUTS YOU BACK TO WORK
Your computer helps you work fast. Unless the printer is running. Then it doesn't help you work at all. It won't let you enter data or process information. It simply won't compute.

That's where Microfazer by Quadram comes in. It's the print buffer that frees your computer. And lets you keep right on working.

THE BUFFER THAT REMEMBERS IT ALL
Microfazer stores data from your computer in its own memory, then sends it to the printer at the proper rate.

You don't have to worry about losing vital information because of limited buffer space. Because Microfazer starts with 8K of memory and is expandable to 512K—a full half-megabyte. So it can keep pace with your needs. Now, and in the future.

THE ANY COMPUTER, ANY PRINTER BUFFER
Microfazer is perfect for any buffer task. Word Processing. Accounting. Graphics.

QUADRAM QUALITY

Available at retail stores worldwide.

Print with Microfazer,™ Remembers It All.

You name it. And it's perfect with any enhancement. Printers. Plotters. Even modems.

You'll find Microfazer in a variety of models and sizes. Some stand alone while others are stackable. There's one that snaps onto the back of the popular MX Series Epson printers. And another that plugs inside an Epson MX or FX.

There's a Microfazer to interface incompatible devices. And for any data transmission need. Serial or parallel.

QUADRAM REMEMBERS TOO

Whatever your system, Quadram has a buffer to handle it. Including Microfazer's counterpart: Interfazer, for buffering and controlling up to eight computers with one or two printers.

Quadram didn't forget the hardware features either. The Ready LED, manual Reset and Pause/Copy buttons are all part of the Quadram Quality tradition.

A PRICE YOU'LL GO FOR

You'll be glad to know that you can get Microfazer backed by Quadram Quality at a price that won't stop you from owning one. Parallel to parallel versions start at $159 (8K). Serial to parallel, parallel to serial and serial to serial versions start at $199.

MICROFAZER. THE PRINT BUFFER THAT REMEMBERS IT ALL.

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CIRCLE 73

A Complete Graphics Department For Just $2295

Realize day-in and day-out solid performance from a quiet and capable desktop plotter. It's true. For only $2295* the Houston Instrument HIPLØT™DMP-29 will provide you with world-class multi-color hard copy graphics, and deliver a level of quality and performance that you would expect in a plotter costing three times as much.

It's a hard worker. The DMP-29 goes about its job with amazing speed and precision. Unbeatable resolution and repeatability are yours in both 8½" x 11" and 11" x 17" formats, and 8-pen capability assures you of fast attention-free flexibility when multi-color output is required. High pen speed combined with an addressable resolution of 0.001" assures fast, accurate and stepless traces.

It's friendly. You can call 21 different functions directly from the front-panel membrane keyboard. It's tolerant too. The DMP-29 will modestly protect itself from user errors, as when attempting to place a pen in an already occupied stall.

And it's smart. An extensive set of firmware routines makes life easier for the user. A small sampling of the built-in talent inherent in the DMP-29 includes character generation, circle, arc and ellipse synthesis, line type variations, viewport/windowing, clipping and scaling.

For the name, address and phone number of your nearest distributor/dealer, write Houston Instrument, 8500 Cameron Road, Austin, Texas 78753. Phone 512-835-0900, or 1-800-531-5205 if outside Texas. In Europe contact Bausch & Lomb Belgium NV., Rochesterlaan 6, 8240 Gistel, Belgium. Tel 059-27-74-45. Tlx 846-81399.

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CIRCLE 60

4P005B

HARDWARE OF THE MONTH

(continued from page 174)

StationMate uses a twisted, shielded wire communications cable and can support up to 64 devices over a 5000-foot bus. It provides three data ports with standard RS-232C connectors, and the modem allows a fourth access.

StationMate uses an adaption of American Bell X.25 level three communications protocol. This protocol provides automatic switching, port selection, and port class selection.

StationMate has a 16k segmented buffer. The setup and configuration are menu driven, with two levels of password security. Auto baud permits easy interface to user devices. It has full diagnostic capability, and error-free data transmission with detection and retransmission in case of transmission-media errors.

Combining three functions in one unit, Station Mate has a 16k segmented buffer, and can support up to 64 devices in a network.

This three-in-one communications device sells for $1450.

FOR MORE INFORMATION: COMPLEXX SYSTEMS INC., P.O. Box 12597, Huntsville, AL 35802; (205) 882-9734.

CIRCLE 572

INTERFACE CONNECTS APPLE IIIs TO CORVUS OMNINET

The Corvus Omninet interface allows Apple III users to connect with a Corvus network of up to 63 computers or peripherals from a variety of manufacturers.

The interface, priced at $495, joins with Apple III Omninet software, the Apple III SOS operating system, and Pascal language on the standard Corvus Winchester drive to provide the same capabilities as the Omninet local area network.

By connecting with a Corvus network, Apple III users

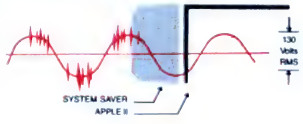
(continued on page 182)

System Saver®

The most important peripheral for your Apple II and IIe.

For Line Surge Suppression

SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes. Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. High frequency noise is smoothed out before reaching the Apple II.

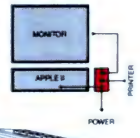


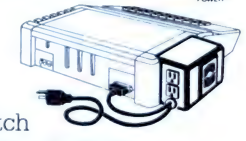
For Cooling

Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and computer itself. SYSTEM SAVER's fan exhausts 15 cubic feet of air per minute.

For Operating Efficiency

SYSTEM SAVER contains two switched power outlets. SYSTEM SAVER efficiently organizes your system so that one convenient, front mounted power switch controls SYSTEM SAVER, Apple II, monitor and printer. The heavy duty switch has a pilot light to alert when system is on. You'll never use the Apple power switch again. Also available in 220/240 Volt. 50/60 Hz.





Easy Installation

Just clips on. Color matched to Apple II.

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$89.95 at dealers everywhere or order direct by phone or mail.
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AARDVARK L.T.D.

TRS-80 COLOR COMMODORE 64 VIC-20 SINCLAIR/TIMEX TI99/4A

QUEST – A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. TRS-80 Color, and Sinclair, 13K VIC-20. Extended BASIC required for TRS-80 Color and TI99/A. $14.95 each.

32K TRS 80 COLOR Version $24.95.
Adds a second level with dungeons and more Questing.

WIZARDS TOWER – This is very similar to Quest (see above). We added wizards, magic, dragons, and dungeons to come up with a Quest with a D&D flavor. It requires 16k extended color BASIC. 13k VIC, Commodore 64, TRS-80 16k Extended BASIC, TI99/A extended BASIC. $14.95 Tape, $19.95 Disk.

Authors – Aardvark pays the highest commissions in the industry and gives programs the widest possible advertising coverage. Send a Self Addressed Stamped Envelope for our Authors Information Package.

ZEUS – It's fast and furious as you become the WIZARD fighting off the Thunderbolts of an angry ZEUS. Your Cone of Cold will destroy a thunderbolt and your shield will protect you – for a while. This is the best and highest speed arcade action we have ever done. Difficulty increases in wave after wave, providing hours of challenging fun and a game that you may never completely master. Commodore 64, Vic20 (16k expander), and 16k TRS-80 Color Computer. (ALL MACHINE CODE!)
$19.95 tape $24.95 disk. (Tape will not transfer to disk.)

ADVENTURES!!!

The Adventures below are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer, commands like "Look in the Coffin" and "Light the torch.")

Adventuring requires 16k on Sinclair, and TRS-80 Color. They require 8k on OSI and 13k on VIC-20. Now available for TI99. Any Commodore 64.
$14.95 Tape – $19.95 Disk.

ESCAPE FROM MARS
(by Rodger Olsen)
This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)
This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

SEAWOLFE – ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color. NOTE: tape will not transfer to disk!
$19.95 Tape – $24.95 Disk.

Dungeons of Death – This is the first D&D type game good enough to qualify at Aardvark. This is serious D&D that allows 1 to 6 players to go on a Dragon Hunting, Monster Killing, Dungeon Exploring Quest. Played on an on-screen map, you get a choice of race and character (Human, Dwarf, Soldier, Wizard, etc.), a chance to grow from game to game, and a 15 page manual. 16k Extended TRS-80 Color, 13k VIC, Commodore 64. At the normal price for an Adventure (14.95 tape, $19.95 disk), this is a giveaway.

Dealers – We have a line of about 100 original programs for the machines listed here. We have High speed Arcades, Quality Adventures, Word processors and Business Software for Small machines. Better yet, we have excellent Dealer support. Phone for information.

Send $1.00 for Complete Catalogue - Please specify system on all orders - $2.00 Shipping Charge on each order

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CIRCLE 75

Over-achievers!

BROTHER COMPUTER PRINTERS DELIVER MORE CAPABILITIES, PRODUCTIVITY AND VALUE THAN ANYTHING IN THEIR CLASS.

ATTTENTION COMPUTER PRINTER USERS:

Brother printers do more than you'd expect them to! They'll deliver superior letter quality hard copies. Operate virtually trouble free. And they're so easy to use that non-skilled personnel can operate them immediately.

You can experience all these quality benefits at prices that defy comparison.

Another significant advantage: Brother can print in both red and black.

And two colors mean twice the impact and prestige to your letters, charts, illustrations, graphs, reports, statements...to every business, accounting and word processing application.

Some of the other outstanding features include an exclusive cassette daisy wheel and a 3K memory that retains data even when off-line. Also 10, 12, 15 and proportional spacing pitch selector, bi-directional printing, automatic copy memory and optional forms and sheet feeding.

Brother Over-achievers are in a class by themselves!

brother®

CIRCLE 76

PER

BROTHER INTERNATIONAL CORP.
8 Corporate Place, Piscataway, N.J. 08854

Gentlemen:

Please send me the name of my nearest Brother Computer Printer retailer.

Name

Company Name

Address

City/State/Zip

(continued from page 179)
can share up to 55Mbytes of Corvus mass storage. They can communicate with every computer on a network, use a common pool of printers, and add new stations with twisted pair wire. Omninet operates over an end-to-end network up to 4000 feet long, at a rate of one million bits per second.

FOR MORE INFORMATION: CORVUS SYSTEMS, 2029 O'Toole Ave., San Jose, CA 95131; (408) 946-7700.
CIRCLE 447

IBM-COMPATIBLE 16-BIT SYSTEM WITH GRAPHICS CAPABILITY

Eagle Computer has announced the Eagle PC, a 16-bit system with an 8088 microprocessor, and 64k main memory expandable to 512k. The unit weighs 30 pounds, with a main processor cabinet that measures 14 inches deep, and a detached keyboard. Two asynchronous serial ports and one parallel port are provided on the main CPU board. Hardware options include Eagle's FILE 10 and FILE 40, which provide formatted Winchester hard-disk storage of 10 and 32Mbytes respectively.

The Eagle PC is compatible with IBM Personal Computer hardware and, using the available MS-DOS and CP/M-86 operating systems and Microsoft's GW BASIC, users can select from a wide variety of software designed for the IBM.

The Eagle PC comes with high-resolution 720 by 352 monochrome graphics. No extra board is needed.

The 105-key keyboard is designed and labeled specifically for word processing and financial planning. Users can tailor the keyboard to their needs by assigning functions to the 24 user-definable function keys.

Single-drive systems are priced from $1995. A fully configured system with 128k main memory that includes software and a single 320k drive costs $2995; with two 320k drives, it is priced at $3495.

FOR MORE INFORMATION: EAGLE COMPUTER, 983 University Ave., Los Gatos, CA 95030; (408) 395-5005.
CIRCLE 417

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SAVE MONEY ON TRS-80® COMPUTERS

Discount Prices!

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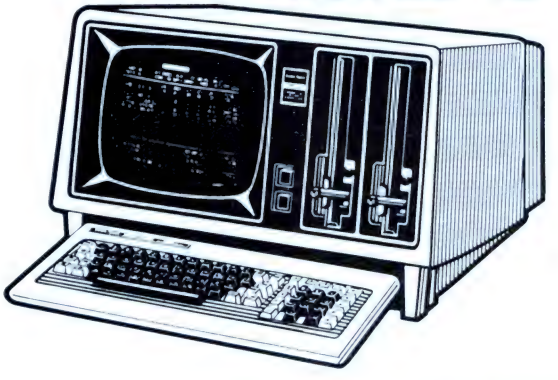
TRS-80 MODEL 12



Two Disk Drive System
(Cat. No. 26-4005)

* All Inventory 100% TRS-80® Equipment
* Free Price List
* No Out-Of-State Taxes

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TRS-80 is the registered trademark of Tandy Corporation

CIRCLE 141

A flawless future is in sight with 3M diskettes.

When it comes to keeping track of precious data, predictable means reliable. Being able to count on every diskette, every time. At 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.

Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

3M hears you...

3M

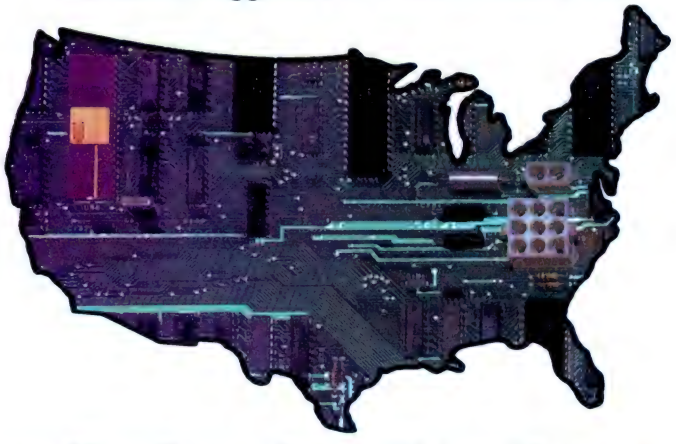
CIRCLE 79

Xerox Service Centers. The personal computer back-up system you've been looking for.

Unfortunately, most people find out the hard way that there's one question even a personal computer can't answer.

Where can you take it for service?

We have a suggestion. Come to one of our



new Xerox Service Centers. We have 82 nationwide. And we're multiplying faster than software programs.

Right now we're equipped to handle Osborne™ Computers, Epson™ MX Series Printers, Pied Piper™ Computers, Morrow Designs Micro Decision™ Computers, Corona Data Systems Computers, Enter Sweet Pea™ Color Plotters, Cameo Electronics Winchester Disk Drives, Okidata Microline™ and Pacemark,™ and Amdek™ products. In addition to a number of Xerox products like the 820 Personal Computer and Diablo™ Printers. But in the future, we'll be servicing even more brands of personal computers and related items.

Our service people have to undergo one of the toughest training programs in the industry. Including plenty of hands-on experience and intensive study of computer technology.

Then we put them through the specialized courses on other brands.

We've even provided a back-up system to our back-up system with a nationwide "hot line" to our Xerox Technical Support Centers. So in the unlikely event your bugaboo baffles our local whiz, there's extra help close at hand.

And we keep our parts departments well stocked. Which means your problem can be fixed a lot faster than you'd imagine.

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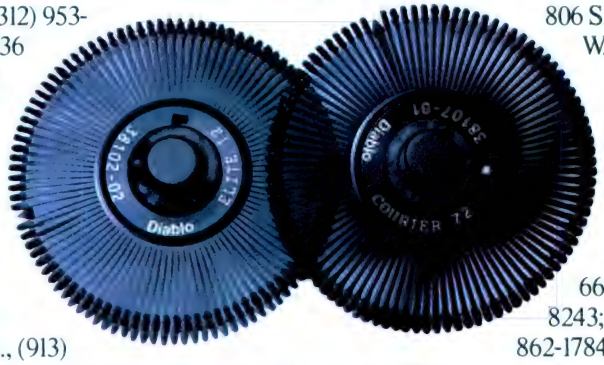

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CIRCLE 85

After you ask what it can do for you now, ask what it can do for you later.

If you're about to buy a personal computer, you need to consider two basic issues: What your needs are now, and what they're likely to be a few years from now.

That's why the HP-86 has to be your best choice. It's got the software and the hardware to go the distance.

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CP/M.® Buy this plug-in module, and you'll extend your HP-86 system to accept many popular programs written under the CP/M operating system — programs such as WordStar™ and dBASE II.™

Graphics Presentations. When combined with the HP 7470A plotter, our graphics software lets you produce professional-quality pie and bar charts, line graphs, text pages, and overhead transparencies. And you can do it all in color.

Data Communications. If you decide you want it, an optional accessory lets you access The Source, the

Hardware that expands with your needs.

While your computer's ability to expand depends largely on software, naturally, the hardware must keep up. That's why the HP-86 system has a modular design. So you can add a printer or plotter as easily as you hook up a tape deck to your stereo. And operate up to 14 peripherals at once, if you wish.

When you find yourself facing lengthy problems or spreadsheet analyses, simply add more memory — up to 640K bytes.

As you demand more of your HP-86, you'll find that it keeps up. Whether you need a broad range of hardware, software, or peripherals, the HP-86 makes expansion easy, giving you a hard-working system tailored to help solve your specific problems.

If you need more good news, try this: The basic system is only $2820** (128K computer/keyboard, 12" monitor and single 3½" disc drive).

Get a hands-on demonstration of the system that works for you now, and will still be working for you later.

For the authorized HP dealer or HP sales office nearest you, call TOLL-FREE 800-547-3400 and ask for operator 102. M-F, 6 a.m.-6 p.m. PST.

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Personal computers & calculators for professionals on the move.

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CIRCLE 80

Software For Organization, Planning, Productivity, And Graphics

Each month Personal Computing *scans the software market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in Showcase of Products, our special subscriber section.*

ADVANCED FINANCIAL MODELING TOOL

MicroPro International Corporation has introduced PlanStar, a financial modeling tool which the company says has advanced capabilities for business forecasting and analysis. PlanStar handles up to 1000 worksheets per modeling project, with a capacity of more than 32,000 cells per worksheet. Any number of worksheets can be consolidated with a single command.

With PlanStar, you can write calculations in English instead of entering formulas in worksheet cells. The calculations are stored separately from the actual worksheets, allowing you to edit them to produce multidimensional reports. Data can be displayed in bar charts or line graphs.

The package includes sensitivity analysis, which automatically changes selected input data to determine the net effect on the bottom line, and goal-seeking, which works backwards to find the starting conditions and assumptions needed to produce the desired goals.

Typical applications for PlanStar include cash flow and investment analysis, pro forma reports, forecasting, and budgeting. PlanStar does all the basic arithmetic, as well as handling leads and lags, positive and negative values, inflation, discounting, net present value, rate of return, regression, and moving average.

By combining data, you can create three-dimensional models. For example, you could give it the instruction: "Consolidate worksheets one to nine," which might provide an analysis of sales throughout the world in 1983. In such a case, each worksheet would represent sales data for a single country, broken out by product and by month.

PlanStar reads any ASCII, comma delimited file and is compatible with other MicroPro products. Information from DataStar, InfoStar, and CalcStar files can be moved directly into PlanStar. PlanStar's text editor uses WordStar commands, and reports, charts, and graphs can be merged into a WordStar file.

MicroPro's support for this program includes a user's manual containing seven sample models, an eight-lesson on-screen tutorial, and the PlanStar Consultancy Service, a subscription service which offers technical help and advice in building financial models. Dealer support is available through a toll-free telephone hot line or through MicroPro's 18 field-sales and service offices.

PlanStar runs on the IBM Personal Computer under PC-DOS, or on any system under CP/M 2.2 or higher. Suggested retail price is $695; a special introductory price of $595 will be in effect through September 30th.

FOR MORE INFORMATION: MICROPRO INTERNATIONAL CORPORATION, 33 San Pablo Ave., San Rafael, CA 94903; (415) 499-1200.

CIRCLE 345

EMPLOYEE SCHEDULING SYSTEM WITH LABOR COST ANALYSIS

Sched:Planner from Key-1 Computer Systems organizes individual employee schedules into weekly schedules, and calculates labor costs for each schedule. It is designed to be used by managers in a wide range of fields. This system is the first in Key-1's Ergonomic Tactical Software series.

To minimize typing, Sched:Planner adopts techniques used in arcade games for data entry. Schedules are entered by "painting" them onto a time line; selections are made with function keys; specifications are set using a moving "pointer"; sound and screen effects pace the user. Virtually the only typing needed in day-to-day scheduling is the name of the employee. Copy, transfer, and repeat facilities are available on-line.

Sched:Planner handles up to 1800 weekly employee schedules on a data disk. This capacity is organized into nine weekly schedules of a maximum of 200 employees each. The user defines the nine schedules—for example, nine consecutive weeks of one facility, one standard week for nine departments, nine experimental versions of one schedule, or any combination. Each employee can be scheduled for up to two shifts per day, covering 24 hours a day, seven days a week.

The user can name up to 40 different "titles" and "assignments." A title is a classification associated with an employee, regardless of what job they are doing on a particular shift. The assignment specifies the nature or location of the work done on a specific shift. Sched:Planner incorporates these categories in the cost analyses, allowing the scheduler to know the cost of each

Business Decision.

Let's be honest.

Despite the "personal computer revolution" in today's office, a lot of business decisions get made in some pretty arbitrary ways.

That's because most of the *software* for personal computers isn't up to the job of helping you draw conclusions from the mass of information in your business.

THE GREAT PERSONAL COMPUTER "UN-REVOLUTION."

Up to now, to use a personal computer effectively in the real world, you needed to use five different types of software packages: Electronic spreadsheet, information management, graphics, word processing, and telecommunications.

You had to learn how to use these five different, unmatched software packages before you could make the computer do what you wanted it to do.

And information stored in one of these packages would rarely fit into another without a lot of trouble.

This means you had to spend your valuable time pushing buttons and learning to become a computer expert.

Instead of using the personal computer as a tool for business decisions.

Not exactly a shining moment in the personal computer revolution.

THE CONTEXT MBA:™ A SIMPLE IDEA WHOSE TIME HAS COME.

The Context MBA is software for the IBM PC, PC-XT, and Hewlett-Packard Series 200 personal computers that combines all the functions you'll ever need - spreadsheet, information management, report writing, graphics, and communications - into a single, easy-to-use package.

The result is a software package that's literally "greater than the sum of its parts."

FIVE SCREENS - NO WAITING.

With the MBA you can connect your personal computer to your company's main computer and retrieve all kinds of business data. Like sales, product, or customer figures.

Sort, search, update, and store this information in your personal computer. Analyze it, prepare sales forecasts or study new business opportunities in minutes, instead of hours.

While you're using the spreadsheet, use the MBA's graphics function to make spreadsheet figures come alive on your screen in charts or graphs. So you can visualize the effect of possible changes to your business.

This year, or five years from now. Instantly.

When you've made sense out of the possibilities, use the MBA's full-function executive report writer to put these words, numbers, and graphs into a finished, printed report.

At last, you can use a personal computer as a decision tool to turn more profit from the mountain of information that crosses your desk every day.

So now even "non-computer people" can make heads-or-tails out of the personal computer revolution.

A GOOD BUSINESS DECISION.

Make a good, well-informed business decision right now:

Call us at *1-800-437-1513* (in California, call 1-800-592-2527), and get the name of your nearest computer store for a live demonstration of the Context MBA. We'll also send you a copy of our tell-it-like-it-is brochure, *Software Explained*.

If you have an IBM Personal Computer, ask for our free ***Context MBA Sampler Disk*** for a live demo of the MBA on your own PC.

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Torrance, CA 90505
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Context MBA™

Personal Computer Software for Business Decisions.

schedule broken down by day, employee, title, or assignment. This helps in preparing budgets, assessing labor contracts, costing out bids, and forecasting the cost of each function of a business.

Sched:Planner can print a copy of each employee's schedule. It can give a graphic display showing the coverage supplied to any assignment for each 15-minute interval during each week. It can also print a planning worksheet for those who prefer to work on paper rather than in front of a screen.

Sched:Planner calculates and reports the costs for a given schedule using each employee's hourly rate as well as user-specified values for break and overtime policies. Reports from the menu include: the daily cost of each employee, the cost of each "title" category, the cost of each "assignment" category, and the total costs. The employee copy of the individual schedule can include the regular and overtime pay for each shift.

The Consolidated Schedule is a master schedule for any week, combining the individual schedules of all the employees, grouped by assignment. Each day is covered on a separate schedule. The time lines are marked off in 15-minute intervals and cover 24 hours a day.

Updates in any employee's schedule are performed with just a few keystrokes, using function and cursor keys. A reference facility allows look-up of user-defined items such as position or assignment names, without leaving the current procedure.

All procedures are selected from one of three menus. On-screen documentation for each procedure is tailored to the frequency with which the procedure is used, and the potential permanent effect it may have on the data. This aims to reduce annoyance for experienced users who don't have to step through the same set of menus repetitively.

Sched:Planner includes a set of instructions called "Guide to Better Scheduling." This manual reviews each of the system's procedures in detail, and describes how the procedures may be used in preparing effective schedules for a variety of situations.

Sched:Planner runs on the IBM Personal Computer, and requires a minimum of 64k and two 320k disk drives. There is also a version for single-sided drives. The system supports the IBM Personal Computer printer, the Epson MX-80, MX-100, and other popular printers. Sched:Planner was designed to accept supplementary modules which add enhancements to the base package. Supplements intended for release in 1983 include larger capacity, Vacancy Detection Module, hard-disk support, Extended Analysis Module, and color. Sched:Planner sells for $750, and the package includes four specially formatted data disks.

FOR MORE INFORMATION: KEY-1 COMPUTER SYSTEMS, 178 Spring St., Newport, RI 02840; (401) 849-4562.
CIRCLE 348

THREE-DIMENSIONAL BUSINESS GRAPHICS AND A GRAPHICS COMPOSING PROGRAM

Corvus Systems has released Corvus Graph and Corvus Paint, two new graphics packages for its Corvus Concept personal workstation.

Corvus Graph lets you create visual models of numerical data which convey large amounts of information. You can portray that information in a variety of forms to help gain better insights into relationships and correlations.

Corvus Graph borrows techniques from three-dimensional modeling and CAD/CAM programs to allow you to construct a graph and view it as if from any angle in space. With this feature, you can correlate four data dimensions simultaneously which provides you with more information than you get with traditional methods. Graph can be used with the Corvus LogiCalc spreadsheet program, with the Corvus EdWord word processing program, or with information entered and edited manually.

Dozens of types of graphs are available from Corvus Graph, and you have the option of modifying existing types or of creating custom designs. Once you choose the graph type and specify the data files, the program creates the graph. The user can, in real time, rotate the graph, zoom in for a closer look, move back, change perspective, and shade portions for greater legibility.

The Corvus Concept workstation has a 720 by 560 pixel resolution, and Graph allows printing to resolutions averaging 2000 to 3000 points. Bit-addressable devices such as matrix or laser beam printers will print hard copy.

Corvus Graph is priced at $395.

Corvus Paint is a black-and-white graphic composing program with more than 200 commands and functions. It produces a wide range of graphic images and can be used to create slide shows on the Corvus Concept.

Data can be input into Corvus Paint using the Concept keyboard, a graphics tablet, or a computer mouse. If you are a new user of graphics or make frequent misjudgements, you'll appreciate Paint's unique "picture undo" function which lets a user backstep to erase mistakes, undoing some or all of them.

The 200-plus commands and functions of Paint are arranged in 20 levels of function keys with on-screen label displays. The layout is consistent for often-used keys. The user can also go directly to any command by typing it in, without going through menu levels.

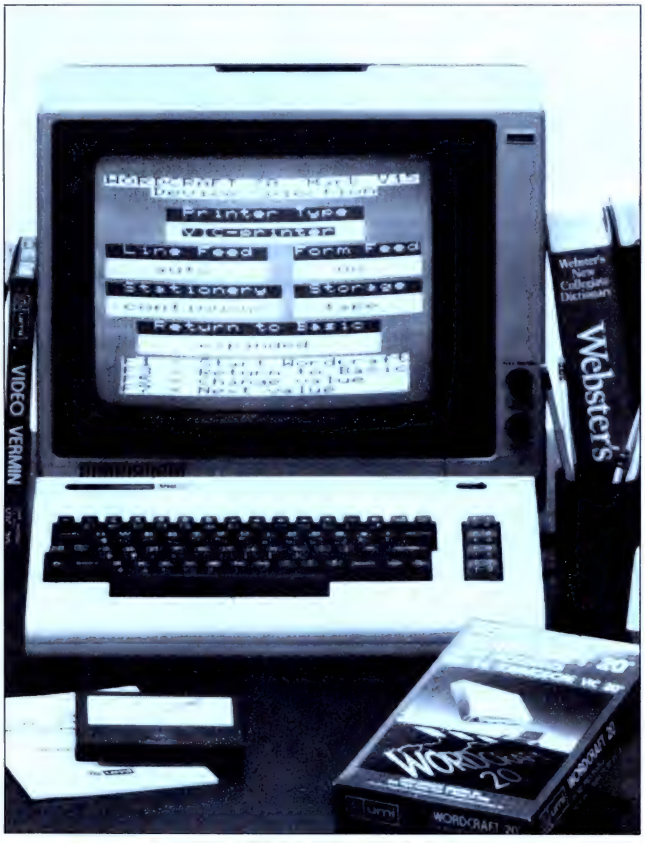
Paint tools include a variety of dots, brushes, dithers, ribbons, lines, blocks, shades, patterns, fills, and effects. In addition to the copy function, Paint has airbrushes composed of randomly generated points sprayed at the cursor location.

Corvus Paint is priced at $695, including a mouse.

FOR MORE INFORMATION: CORVUS SYSTEMS, 2029 O'Toole Ave., San Jose, CA 95131; (408) 946-7700.
CIRCLE 305 and 306

BUDGET-PRICED WORD PROCESSING FOR COMMODORE VIC-20

United Microware Industries has introduced a word processor for the Commodore VIC-20 called Wordcraft 20 which, according to the company, lets the home-computer user do quality word processing for under $1000. Russ Bedford, president of the Pomona, Calif.-based company, explains, "Most of us own a television set, so adding a VIC-20 (at its most current price of $140), a disk drive ($300), printer ($400), and Wordcraft 20 ($149.95)—provides a household with complete word processing for less than $1000."



Wordcraft 20's menu selections make use of the VIC-20's function keys to provide flexibility and ease-of-use.

"Wordcraft 20 writing may be stored using the two-tape cassette player rather than the disk drive, which lowers the cost by $230," Bedford says.

Wordcraft 20 plugs into the VIC-20 like a game or memory cartridge. The cartridge holds 16k of program on ROM chips. Wordcraft 20 Plus contains an additional 8k of RAM usable for BASIC programs; it is priced at $199.95.

Wordcraft 20 can create documents, correspondence, personalized form letters, mailing lists, and other special-purpose projects. The program is designed to be learned quickly and easily. It makes use of the VIC-20's function keys and other special keys.

Wordcraft 20 has a page capacity of 66 lines of 99 characters. You can alter page width and length any time. It features automatic line centering, justified or ragged margins, text highlighting, tab stops, decimal tabs, hard and soft hyphens, and display color control. Up to 40 pages of text can be stored by the program on a cassette or disk.

Wordcraft 20 has automatic word wrap to eliminate broken words. It has paragraph merging to insert blocks of copy into previously typed text, and search and replace to let you make a single change repeatedly throughout the text.

Wordcraft 20 documents can be encrypted to be unreadable by anyone who does not have a special key code.

A reference chart is included, along with an index, page ruler, and status displays. Text can be inserted, deleted, and merged, and individual characters, words, lines, paragraphs, and copy blocks can be deleted.

Standard screen display is up to 99 columns without any add-on converters or circuit modules. Wordcraft 20 allows automatic return to VIC BASIC without removing the Wordcraft cartridge.

Wordcraft 20 will format disks, force new pages as called for by text length, and provide a non-destructive file directory.

FOR MORE INFORMATION: UNITED MICROWARE INDUSTRIES, 3503-C Temple Ave., Pomona, CA 91768.
CIRCLE 366

TIME AND BILLING MODULE FOR PROFESSIONAL SERVICE FIRMS

Professional Time and Billing, State of the Art's new addition to its small-business accounting library, is designed for such service professionals as attorneys, accountants, architects, or consultants.

The Professional Time and Billing module can be used as a stand-alone timekeeping system as part of an integrated accounting system in combination with other State of the Art modules such as General Ledger, Payroll, and Word Processing. Common data requires only one entry with automatic posting and transfer.

According to State of the Art president Charles P. Milden, this package was "specifically designed for organizations that bill service by time, where inadequate record keeping and analysis can cut deeply into profits."

The timesheet entry system records both billable and non-billable time, as well as expenses on accounts and special projects. It stores employee records for future analysis. The billing system turns the time and expense

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You can find Great Plains Software at your local computer store – or call us for more details. We'll be glad to show you how the Hardisk Accounting Series can simplify your books.

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- Operates on Apple III, IBM PC

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- Flexibly formatted financial statements
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ACCOUNTS RECEIVABLE
- Up to 32,767 customers*
- Profit by customer, customer type, salesman and state
- Open item or balance forward
- Automatically posts to G/L

ACCOUNTS PAYABLE
- Up to 32,767 vendors*
- Accommodates manual or generated checks
- Automatically posts to G/L

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INVENTORY
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GREAT PLAINS™ SOFTWARE

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records into detailed bills for clients. An accounts receivable subsystem tracks client billings and processes cash receipts.

Reports generated by Time and Billing include standard audit and employee productivity, project budgeting, unbilled time, and project profitability.

The Professional Time and Billing module can be integrated with the State of the Art General Ledger System to provide automatic posting of revenue and cash receipts with complete audit trail reporting.

This module is designed like other State of the Art accounting packages that assume little or no computer experience, and is run through user prompts and instructions. The manual contains sample reports and examples.

The Professional Time and Billing module runs on the Apple II, Apple III, and IBM Personal Computer, and has a suggested retail price of $795.

FOR MORE INFORMATION: STATE OF THE ART INC., 3183-A Airway Ave., Costa Mesa, CA 92626; (714) 850-0111.

CIRCLE 363

INTEGRATED SPREADSHEET AND GRAPHICS

GraphPlan from Chang Labs offers a spreadsheet, statistical commands, presentation-quality graphics, and sorting and ranking capabilities in one package.

The formulas built into the spreadsheet are designed to require 70 percent fewer keystrokes than a standard "calc" spreadsheet. A standard "calc" spreadsheet requires twenty keystrokes to add two rows, while GraphPlan requires only five keystrokes to perform the same task.

GraphPlan generates legends as well as numerical, date, time, and logarithmic X and Y axis labels and tic marks. It lets the user create explodable pie charts, horizontal or vertical line and bar graphs that can be stacked, and scattergrams. These graphs can be created individually or combined.

Since the package is fully integrated, changes in the spreadsheet are recorded in the graphics, and the user can switch between the spreadsheet and the graphics without exiting the program, by hitting a single key.

GraphPlan prompts the user to enter information and

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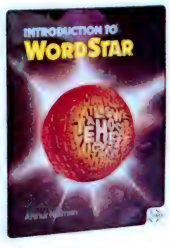

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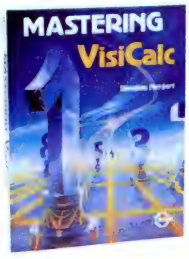

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CIRCLE 90

SOFTWARE OF THE MONTH

has common formulas stored, so they don't have to be re-entered each time they're used.

GraphPlan is a member of the Chang Labs integrated family of products, and can be used with MicroPlan, a financial planning package.

GraphPlan runs under CP/M, and on the IBM Personal Computer under MS-DOS. It supports printers such as the Epson, IDS, Microline, C. Itoh, the HP 7470A two-pen plotter, and those compatible with it. It requires a minimum of 64k RAM, and at least one double-sided disk with 330k of storage.

GraphPlan is priced at $395.

FOR MORE INFORMATION: CHANG LABS, 5300 Stevens Creek Blvd., Suite 200, San Jose, CA 95129; (408) 246-8020.
CIRCLE 314

DATA-BASE MANAGER WITH WORD PROCESSING

Sequitur from Pacific Software Manufacturing Company is a relational data-base management system with integrated word processing, report and form generators, and text merging capability. It was originally developed for multiuser, multitasking UNIX minicomputers, and is now available on the PC-DOS operating system of the IBM Personal Computer and XT, and also on MS-DOS for IBM-compatibles.

Sequitur is designed to make the power of a relational data base available to novice users in office automation applications. The Sequitur interface bypasses the need for users to learn a programming language. Users perform data-base queries by filling in tables with examples of desired information.

Sequitur is also suited for document management applications. Users enter data and then edit, manipulate, and analyze it using a single screen-editing interface. Sequitur's word-processing capabilities (including block-move, search and replace, and dynamic word-wrapping) are integrated extensions of its data-base management capabilities.

Display dimensions, defined by the user, are "windows" through which you can scroll and edit larger entries. Entries can be of different lengths, and a single file (or a single record) can contain many documents which may be selected, compared, analyzed, and edited without ever leaving that file.

With Sequitur's relational commands, the user can select and combine records from several files into a new file, and edit any number of related documents in a single file. Because the new file need not be a separate copy of the original, any editing done on the new file can be automatically reflected in the original files. All the older versions of a file remain available until the user chooses to discard them.

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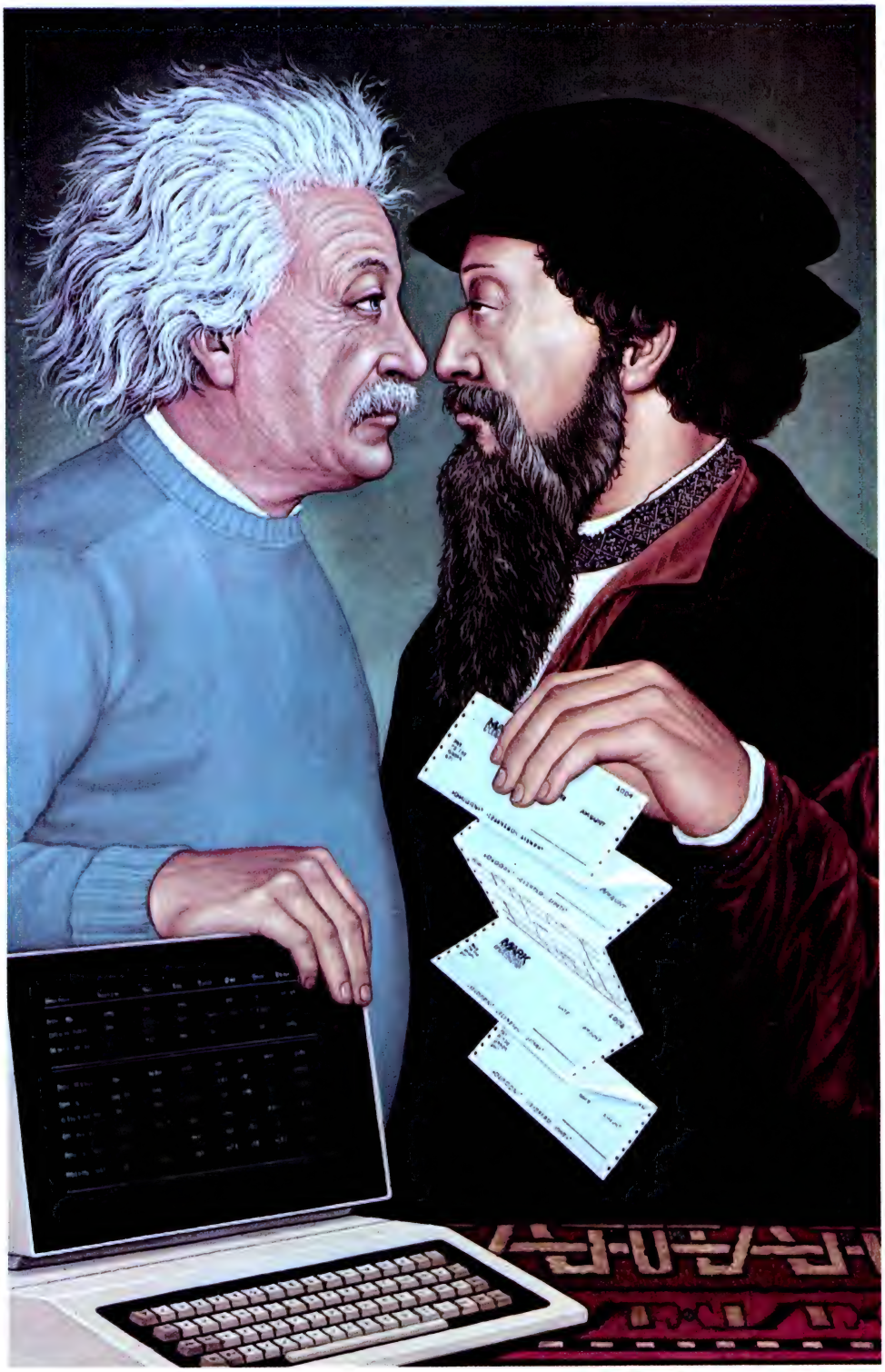

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CIRCLE 83

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CIRCLE 84

SOFTWARE OF THE MONTH

Sequitur provides a variety of output options. The user can create customized form letters and reports, and use Sequitur's text-merging capability to combine data and generate output from several tables in the data base.

The retail price for Sequitur is $795. It requires a minimum of 256k RAM.

FOR MORE INFORMATION: PACIFIC SOFTWARE MANUFACTURING COMPANY, Tenth and Parker, Berkeley, CA 94710; (415) 540-5000.

CIRCLE 350

PERSONAL PRODUCTIVITY FOR $395

PeachText 5000, from Peachtree Software Inc., combines the PeachText word processor, the Random House Electronic Thesaurus, Spelling Proofreader, the PeachCalc electronic spreadsheet, and List Manager in one package to provide a series of functions from word processing to data-base management.

PeachText word processor features print and editing capabilities for a variety of documents; it supports many specialty printers and uses all the function keys of the IBM Personal Computer.

The Random House Electronic Thesaurus provides access to more than 4400 indexed words and 26,000 synonyms.

The Spelling Proofreader can check a 10,000-word document for spelling and typos in less than two minutes.

The PeachCalc electronic spreadsheet offers a worksheet which includes up to 254 rows and 63 columns of text, numbers, and formulas. It can be used for forecasting, profit and loss statements, rate of return calculations, pricing, loan amortizations, and other applications. Using PeachCalc's merge functions, you can combine spreadsheets. Material from PeachText files can be fed into PeachCalc through use of the Execute command.

List Manager allows the user to define and create records up to 14 lines long. A file can be presorted, and can contain up to 32,765 records if you have the disk space. Files can be changed or combined as needed, and the presorting feature lets you browse through files at relatively high speed. List Manager uses Peachtree's Visionary screen manager and index file manager to provide control over design and use of data files.

Two volumes of documentation come with PeachText 5000—a Lesson Plan and a Reference Guide. Priced at $395, PeachText 5000 is available for the IBM Personal Computer, the Compaq Portable Computer, the Texas Instruments Professional Computer, and the Z-100 by Zenith Data Systems.

FOR MORE INFORMATION: PEACHTREE SOFTWARE INC., 3445 Peachtree Rd., N.E., Atlanta, GA 30326; (404) 239-3000.

CIRCLE 331

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Locksmith	100	75
Optimized System Software, Inc.		
Speed Read Plus	60	43
PBL		
Personal Investor	145	99
Penguin		
Additional Fonts Char Set	20	15
Comp Graphics/ Apple Tablet	120	86
Complete Graphics System	70	50
Graphics Magician	60	45
Special Effects	40	30
Special Effects Apple Tablet	70	50
Phoenix		
Zoom Graphics	50	38
Program Design		
New Step-By-Step	80	58
Step by Step II	90	70
Quality Software		
Bag of Tricks	40	30
GBS—DB Appl Dev Program	650	488

Sensible		
Applesoft + Struc. BASIC	40	30
Best	40	30
Bug, The	50	32
Build Using	30	23
Disk Organizer	30	23
Disk Recovery	30	23
DOS Plus	25	19
Edit Soft	40	30
Image Printer Epson	40	30
Image Printer Letter Qual	40	30
Image Prtr NEC/ Dot Matrix	40	30
Multi Disk Catalog	25	19
Quadrant 6112	30	23
Quickloader	25	19
Sensible Speller	125	94
Sensible Speller Pascal	125	94
Sens. Speller Word Handler	125	94
Super Disk Copy	35	26
Sierra On Line		
Dictionary	100	70
EPF IV	80	56
General Manager II	230	168
LISA	80	56
LISA Educational System	120	83
Screenwriter II	130	85
Screenwriter Professional	200	149
Silicon Valley		
Dictionary	125	94
List Handler	90	68
Word Handler	199	145
Sirius		
Pascal Graphics Editor	100	75
SOF/SYS		
Executive Secretary	250	188
Executive Speller	75	56
Softech		
BASIC Compiler & Runtime [5]	225	169
Softeach	125	94
UCSD p-System Set [5]	625	469
Xenofile	50	39

Apple IIe

Most Apple II products also run on the IIe (call for details). Products below are specially designed for the IIe.

Software Dimensions	LIST	SALE
Accounting + IIe		
AP	395	289
• AR	395	289
• GL	395	289
• Inventor	395	289
• Payroll	395	289
• POE	395	289
• POS	395	289
• SOE	395	289
Software Publishers		
PFS: File	125	94
PFS: Graph	125	94
PFS: Report	125	94
Visicorp		
Visicalc	250	189

Applied Software Technology	LIST	SALE
Versaform	495	371
Datamost		
Write On	130	99
Denver Software		
EASY	750	562
Insoft		
ALD System III	75	56
Transforth III	125	94
Link Systems		
Data Fax	249	187
Link Index	195	149
Link Sampler I	60	45
Link Video	55	42
Software Publishers		
PFS: File	175	129
PFS: Graph	175	129
PFS: Report	125	94
Visicorp		
Business Forecasting Model	100	78
Desktop Plan	300	234
Visicalc Advanced	400	312
Visischedule	300	234

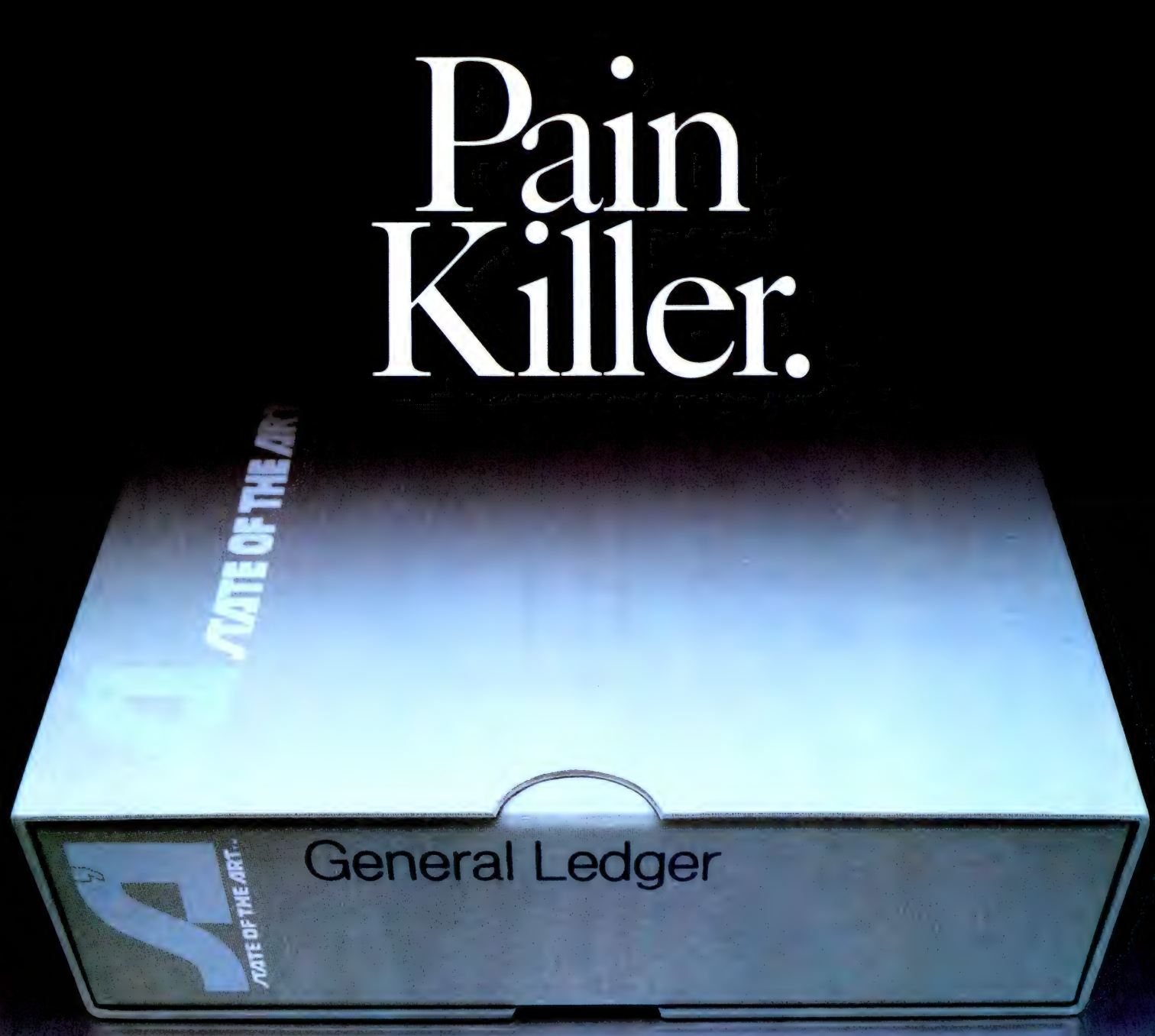
Apple Hardware

Eastside	LIST	SALE
Wildcard	130	109
Hayes		
Micromodem II [5]	379	259
Kensington		
System Saver Fan	90	69
Kraft		
Joystick	65	49
LJK		
Lower Case Char Gen	25	19
Micro-SCI		
A2 35T Disk Drive	479	329
Microsoft		
16K Ram Card™	100	69
Premium System™ [5]	695	489
New Premium Card (32K printer buffer, 256 byte type ahead, 64K memory, 80 col., CP/M	495	369
Softcard™	345	219
Personal Computer		
Applicard 6 MHz	595	449
TG Products		
Joystick	60	45
Selectaport	60	45
Trackball	65	49
Versa Computing		
Versawriter Graphics Tablet	299	249
Videx		
Enhancer II	149	119
Function Strip	79	65
Inverse Character Set	29	24
Lower Case Chip	29	24
Lower Case Chip (Rev 0-6)	35	29
Micromodem Firmware	29	24
Soft Video Switch	35	29
Videoterm Switchplate	19	16
Videoterm with Softswitch	375	239

TM = Manufacturer's trademark

Software Specials

Pain Killer.



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CIRCLE 52

Bank Computerizes For Greater Efficiency

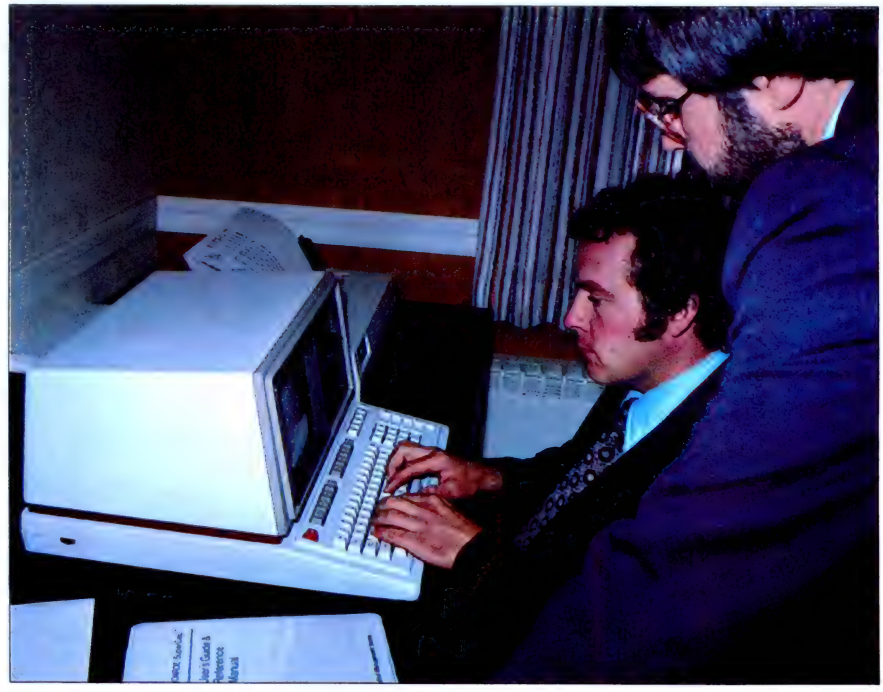
Improving management productivity and increasing efficiency are ongoing goals at the Monadnock Bank in Jaffrey, N.H. Officials at Monadnock, whose $52 million in assets and two branch offices make it the largest commercial bank in Cheshire County, are using personal computers to help meet these goals.

"We were searching for an electronic device to automate loan applications and other documents usually prepared and filed manually," explains William R. Spaulding, vice president and senior commercial loan officer. The bank was already using a programmable financial calculator from Monroe Systems for Business, and when Monroe introduced the OC 8820 Occupational Computer last year, officers at the bank decided to look into it.

The new personal computer offered Monadnock advanced capabilities designed for complex financial applications, including the loan transaction system specified by the bank. "As we experimented with the demonstration model, we discovered a wide range of potential applications to justify its cost," says bank treasurer Dennis P. O'Loughlin. "We immediately recognized that the OC 8820 would meet our needs for a loan form processor, and would automate other essential operations in the commercial, installment, mortgage, and personal loan areas."

Two Monroe OC 8820 Occupational Computers, an MA 8635 dot-matrix printer, and an MA 8640 letter-quality printer were purchased for the bank. One of the computers has been used with the Monroe SuperCalc SuperSheet program to prepare automated financial spreadsheets for Monadnock's corporate loan customers. A minimum of two spreadsheets a year are prepared for more than 60 corporate and business clients. This includes preparation of three-year financial histories and detailed comparisons with rival firms.

Other spreadsheet programs have been designed for small companies and individual proprietorships. "Although not as detailed as the spreadsheets developed for larger companies, these brief reviews provide the bank with much more data than was previously available on the manually written forms," Spaulding says. "Our electronic worksheets are often valuable to the proprietors of small businesses who generally do not have the resources to develop and maintain in-depth financial analyses."



William Spaulding can complete a thorough financial review of a company within 20 minutes using his personal computer and an electronic worksheet program.

"It used to require four hours to calculate and enter the data on each of these worksheets by hand," Spaulding says. "Using the OC 8820 with SuperCalc SuperSheet, I can complete a thorough financial review of a given company within 20 minutes. This gives me more time to analyze the data accurately and work with our clients. When I enter dollar amounts from the customer's balance sheet and financial statement, various ratios and percentages are computed instantly."

Monadnock plans to use the OC 8820's telecommunications capabilities to access credit ratings directly from the bank's credit bureau mainframe computer. Automated credit

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CIRCLE 132

data and financial analyses can then be reviewed with the loan applicant immediately.

The bank will also be communicating with its own mainframe computer, external time-share services, and data banks for such information as immediate yields on bank securities and industry financial reports from news wire services.

At the moment, O'Loughlin is using one of the computers with SuperCalc SuperSheet for periodic management analysis of Monadnock's own financial condition. "Within minutes, I can prepare complex management reports that consider various ratios and percentages, as well as the bank's underlying financial strengths and weaknesses," he says.

An Extra Hand On The Force

In March of this year, after eight months of posing as bartenders in a secret operation designed to catch thieves, San Jose, Calif. police arrested 45 people and recouped more than $1.5 million in stolen goods. Right there beside them, tracking and updating their progress throughout the case, was an Apple III personal computer.

It began on July 19, 1982, when the police department set up a phony bar called Russ and Rosie's in downtown San Jose. Staffed entirely by undercover police officers, the bar quickly gained a reputation as a place for customers to unload stolen goods in return for cash—no questions asked. Transactions took place in a back room, while out front, unsuspecting patrons enjoyed beer and sandwiches. Unbeknownst to all of them, however, the hidden videotape cameras and microphones were documenting the 233 property and 35 narcotics transactions police made throughout the months of the successful "sting" operation.

Meanwhile, back at the police station, operations of a different kind were taking place—behind-the-scenes record keeping of all the people suspected of selling stolen goods, a function perhaps as vital to the project's success as the acting abilities of the bartending, floor-sweeping officers.

It was Carolyn Wall, senior typist/clerk of the Burglary Prevention Unit of the department, who, armed with the Apple III, and PFS:FILE and PFS:REPORT database management software from Software Publishing Corp. in Mountain View, Calif., kept close tabs on the vast amount of ever-changing data in the operation.

The computer donated by Apple Computer Inc. arrived at the police department just weeks before the sting operation began, and it was Wall's brainstorm to use it to maintain the case's files. Though she had never used a personal computer before, Wall says, "It just kind of dawned on me that this would be a perfect use for it."

She explained her idea to the computer installer—filing away the names of suspects and pertinent details about them, transactions they had been involved in, their status with the courts, etc. She also wanted to keep a file on each exchange of goods between the police and a suspect, complete with transaction number, the case number assigned to it, the items bought, and the suspect's name. The installer recommended PFS software, and Wall took it from there.

Wall contacted Software Publishing, and the company was eager to help, providing complimentary copies of PFS:FILE and PFS:REPORT. She then set up two files for maintaining information: The WASP file, with details on the transactions; and the WASPER file, with specifics on the suspects themselves.

With PFS:FILE, Wall had the freedom to set up the information forms however she wanted them. She took advantage of her options and left room for many details, including a space to input whether the suspects' names had been confirmed, and a space to state whether the police had a current photo of a suspect. Later, she updated the forms to include entries on individuals' court dates and docket numbers.

The system, Wall says, was a major improvement over the filing method she'd used for the previous sting operation in which she had been involved. "I had used Rolodex cards," she says, "and it was nowhere near what we can do on the computer."

But it was PFS:REPORT which really made the difference over the old system. With REPORT, Wall could tell the computer which information she wanted extracted and how she wanted it sorted. The software compiles data from the files and arranges it however it is commanded. Upon instruction, the computer makes an alphabetized report of those suspects whose identities have not yet been confirmed and prints out the information—a decided improvement over sorting through Rolodex cards manually. "With the old way, you could never see at a glance which persons had been identified and which ones hadn't," Wall says. "You could only sort by case number or by name."

Although this was her first experience with a personal computer, Wall handled the task like a pro. She says it didn't take long to learn to use PFS, and explains her quick acclimatization to the personal computer this way: "I'm an organizer. I kind of take to it."

While other employees at the police department are gradually catching on, their enthusiasm still doesn't match the level of Wall's. "They don't have the curiosity I have. I'm the type who would spend hours thinking about how to set up the program." In fact, before the department had even received the Ap-

(continued on page 207)

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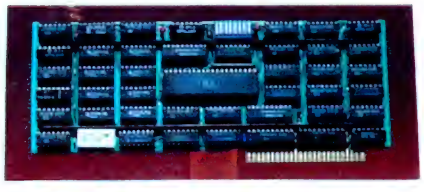

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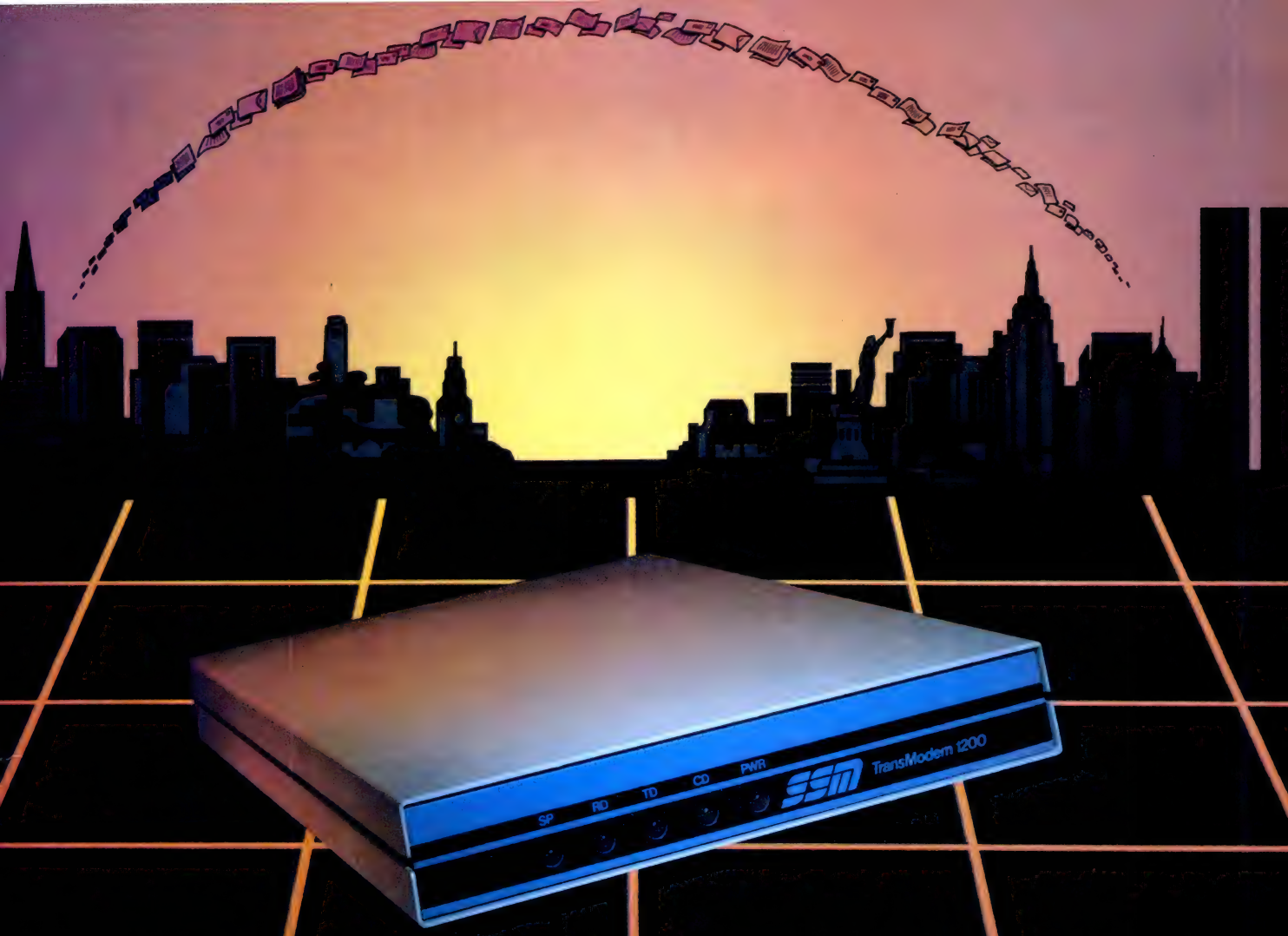

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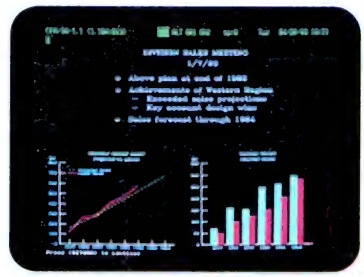
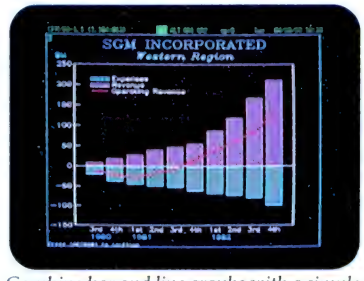
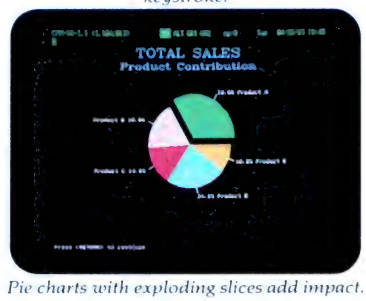


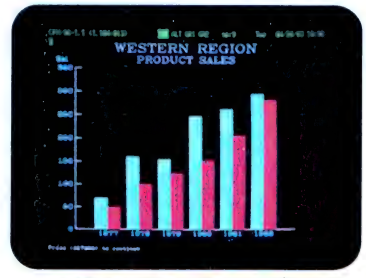
Multiple graphs on a single page



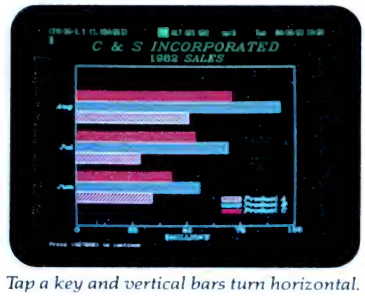
Combine bar and line graphs with a simple keystroke.



Pie charts with exploding slices add impact.



Create clustered bar graphs.



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(continued from page 203)

ple, Wall had taken the literature home to read. "I was ready before I even got it!" she exclaims.

Once the project was underway, Carolyn Wall began to see more uses for the computer in the sting operation. She set up a simple code to identify which stolen property within the files had not been claimed by burglary victims. An asterisk (*) was input next to the items whose owners had been identified; two hyphens (--) meant property was still unidentified. Then, by entering "key words" for each case, Wall identified the name of stolen objects—for example, "audio," "tools," or "guns." Using PFS:REPORT she could print out a report on those properties which hadn't been identified, in order to help victims searching for their stolen property.

Without the computer, Wall says, victims would have had to talk to the few officers directly involved with the case to find out whether their property had been recovered. "We just didn't have an adequate way [to deal with the inquiries]," Wall says. Now, however, "Any of us in the office can use this list to help someone over the phone." And in dealing with an operation of this magnitude, with the enormous amount of stolen goods, having that information at one's fingertips is vital.

Computerizing the data proved useful in another way, as well. "The printout is so good for seeing if you made mistakes," Wall says, noting that it's easy to spot duplicate entries. Throughout the operation, officers held weekly meetings to review the reports, often using them to clear up discrepancies such as two suspect files, one for a man named Chuck and one for a man named Charles, who were actually the same person.

The Apple's day-to-day role within the police department is to record confidential intelligence information, such as tips from the public on illegal activities which may later be useful to the police. But Wall says she definitely plans to use the Apple for future sting operations. "I'll never handle one again without it," she says.

Computer Aids In Students' Job Search

The use of personal computers by employment agencies to match jobs and people is already an existing, working concept. But using a personal computer as an interactive electronic recruitment tool is new. And it is now working in a cooperative effort between the Massachusetts Institute of Technology's Office of Career Counseling and Placement, and Professional Data Corporation of Cambridge, Mass.

Robert Weatherall helps graduate student Steven Kostant access job listings.

The software service, called Connexions, matches MIT seniors and alumni with current job opportunities. The service publishes up-to-the-minute listings of help-wanted ads, and allows the MIT computer users to communicate directly with prospective employers.

But MIT was not randomly selected to participate in this innovative system. "We selected MIT because of the caliber of its students," says Margaret Boles, a spokesperson for Professional Data Corp. "We noticed kids lined up in the placement office, waiting to sign up for on-campus job interviews. These hundreds of kids have to fight for a possible 20 or 30 appointment slots, and so many students miss out. Yet, they still want to have contact with these recruiting firms."

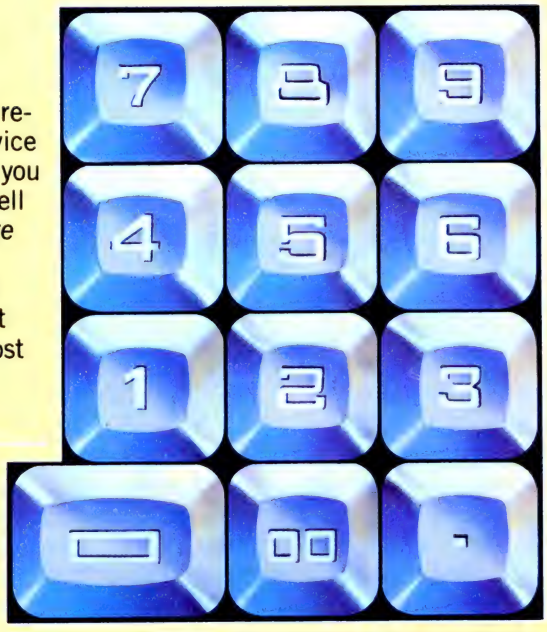
Here's how Connexions works at MIT. The computer (in this instance, donated by Professional Data Corporation) is installed in the MIT Office of Career Counseling and Placement. "Students come in and log on to the computer, call up Connexions through a telephone modem, and they're ready to input their personal data," explains Boles.

After completing the preliminaries, a number of statements appear on the screen, explaining how Connexions works. Next, questions appear, inquiring about the student's expertise in various areas, experience, and finally asking whether he is interested in signing on. "If the answer is 'yes,' there are more questions to answer, to help carve out a niche," says Boles. "The computer then gleans the appropriate job listings from its complete listing file." For example, if a student wants to work just in Massachusetts, only those jobs with the appropriate location will come up. "No other jobs will come up," notes Boles. "You can stop whenever you want."

When a job listing appears, and if the student is interested in it, he puts his resume on-line, along with a cover letter. These data are then sent to the recruiting company directly—bypassing the data base. Without having to wait, students can become familiar with, and tie into the national job market.

"The procedure is simple," says Robert Kvall, president of Professional Data Corp. "The benefits can be realized immediately. Students can now correspond electronically with potential employers and reply to prescreening questions, avoiding

KEYS TO SUCCESS



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Practical Accountant is designed around fundamental accounting procedures. Even if you don't know much about accounting it is an ideal program.

The manual explains basic accounting terminology and provides a comprehensive tutorial. It will take you step-by-step through the process of setting up a complete, single entry accounting system you can begin using right away.

It's quick to learn and convenient to use.

The program guides you with easy-to-use menus and provides on the screen prompting. "HELP" is never more than a keystroke away. It even does some of your work for you like organizing entries in date order even if you don't.

It's very flexible. You set it up to fit your business.

Practical Accountant allows you to set up your "Chart of Accounts" (income and expense categories) with up to 50 categories, 300 sub-categories and with 20 tax type definitions—all defined by you. The manual shows you how to set up an accounting system for a small business, complete with samples.

Cash Flow Reporting— money management information.

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CIRCLE 95

lines, sign-up sheets, travel, mail delays, and complicated interview schedules."

Robert Weatherall, director of MIT's Office of Career Counseling and Placement, sees the Connexion connection as a real advantage for graduating students at MIT. "Now we can streamline the job placement process . . . We have 2000 undergraduate and graduate students receiving diplomas this year; 1800 avail themselves of our services," he says. "Another 400 alumni return yearly, seeking assistance with job placement. Connexion's services make sense in a school that educates and graduates such a large number of people with technical skills."

Presently there are more than 100 companies hooked up to Connexions. And they're all the high-tech companies MIT graduates prefer to work for, says Margaret Boles. "Every 'hot' company is now on Connexions, since these are the companies that are hungry for MIT talent."

Weatherall feels the application of this software service on campus is truly a cooperative and complementary effort which joins the educational and business communities. "As one of the nation's premier technical schools, MIT prides itself on the quality of its education, the high market demand for its graduates, and the quality of the services it offers its students," he says.

Having Connexions on-line is delivering another tool to the MIT students. "It links our technically trained students to the high-tech business world and, we believe, provides those same businesses with greater access to desirable candidates for technical positions," says Weatherall.

The system is working well. MIT students using Connexions are getting the interviews. Connexions is "a natural extension of computer use," says Boles. "It serves to give people a clearer picture of the job market.

Concludes Robert Kvall: "For MIT students, Connexions is an educational, electronic medium with the added benefit of providing them (students) with immediate access to labor-intensive companies."

Free Employee Loans Earn Interest In Computers

The Aid Associations for Lutherans, the nation's biggest fraternal insurance society, is offering 1200 of its employees interest-free loans to buy personal computers. The only return the company expects from this investment is increased interest in computers.

In fact, the AAL, based in Appleton, Wisc., has offered their employees loans of up to $2000 to help them bring computers into their homes. The society is also providing information to help workers select and use their personal computers.

The AAL, which provides insurance to 1.3 million members, is making this offer to their employees because company managers feel there is probably no skill so central to the insurance industry as the ability to use a computer.

"Computer literacy is becoming an increasingly important office skill," says John Pender, senior vice president, financial operations. "So we think it will be a distinct advantage for AAL, and for our employees, if we all have some experience dealing with computer systems."

The association has about 350 computer terminals and 50 word processors in its headquarters. That's twice as many as there were two years ago, according to Greg Michaelson, systems consultant for the AAL. Those whose jobs already involve computers include more than 125 programmers, technicians, and administrators in the AAL's data-processing section.

"We're forecasting tremendous growth in office automation," Michaelson says. "We're not replacing people, but the computer allows us to do our jobs better. As we look at it, we're a service-based, information-driven industry. We're a product of our age."

Michaelson is pleased with the employees' reaction to the loan proposal. "The response has been outstanding," he says. So far, more than 75 employees have taken advantage of the loans.

When the plan was announced to employees in February, eight lunch-hour seminars were scheduled to help the employees learn how they could use a computer and what to look for when buying one of their own. So many employees signed up for the seminars that three more sessions had to be added.

The lunch-hour seminars, conducted by Michaelson, have covered hardware and software, prices, service, hidden costs, and tips on how to purchase.

Originally, the loan program was to expire in May, but because of the enthusiastic response, it was extended to the end of November. It also became evident that the increasing complexity of the personal-computer marketplace made shopping for a computer a lengthy process.

Employees apply for the loans by presenting an "intent to buy" invoice from any computer provider. The invoice is reviewed by AAL computer specialists who authorize the loans.

The company has made it a point not to recommend specific brands of computers, software, or add-ons, and hopes only to provide interested employees with the knowledge necessary to make their decision.

Michaelson says that the employees intend to use their personal computers for word processing, data management, financial management, connection with external data and information sources, and education and

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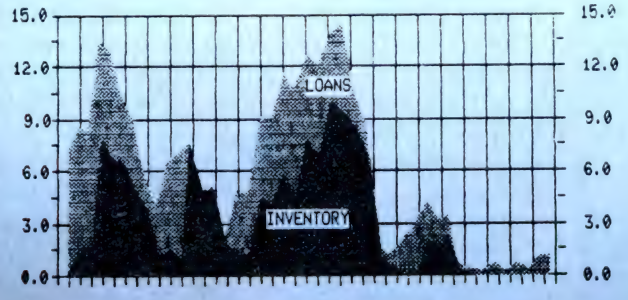

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entertainment through games. He says there are also several employees interested in computer-generated art and one who wants to use his computer to make music.

Payments on the loans will be collected through payroll deductions which will be spread over time. Both loan programs represent an investment the AAL believes will pay dividends for years to come.
—*Tom Richards*

Reams of Paperwork Reduced

Thomas Paikeday was well aware of the monumental task ahead of him when he set out to write *The New York Times Everyday Dictionary*. Since his original research plan included massive data collection, cross-referencing, and collating, the entire project seemed impossible for one person to do alone.

A computer seemed the answer to his special needs—all he had to do was choose the appropriate system. "I shopped around a lot," he remembers, "and after comparing the prices and storage capacities of some of the major brands, I decided on the TRS-80. And it's done all I expected it to as a prototype machine. It has helped me make a breakthrough in my line of work."

Paikeday estimates that had it not been for his computer the dictionary would have required 50 to 100 times more work. "I don't have the kind of organization that those at Oxford University have," he says. "I saw the computer as a means—an opportunity—for me to do a comparable job."

Paikeday hired an expert to write software programs for the dictionary project. "No such program existed," he recalls. "The data-base programs on the market are quite different. My data file isn't organized with any sort of structure, except for the structure of the English language. It's a big ocean of texts—quite open-ended and of indefinite capacity, limited only by the limitations of one's external storage."

A word program such as the one designed for Paikeday has a flexible configuration which allows him to accommodate changes in English usage. One of the most interesting parts of the program is the concordance feature. "Here I can line up identical words of a file in strings of 128 characters, each showing the key word in various contexts," Paikeday explains. "This helps you study patterns of meanings as well as syntax through hundreds of examples.

"I count words," says Paikeday. "How many times does 'computerist' occur? 'Computernik?' All I have to do is key in 'computer' leaving no space after it, and the concordance brings out every word starting with that string: computerist, computerite, computernik, etc. You will see at a glance that computerist is the predominant form, the one to go into the dictionary."

"The advantage of this kind of data file is that every word in it can be used as a key word," he continues. "A dictionary has to treat the meaning and grammar of every word in the language. Finding words using my program is like fishing in the ocean, with the added advantage of a computer. You just specify what type of fish you want and every one of them (we call them word tokens) appears in the center of your screen, swimming in its natural habitat. Compare that with fishing in an aquarium consisting of individual tanks, each occupied by one specimen—what they do at Oxford and Merriam-Webster using pigeonholes, card files, and such." The implications are apparent.

Keeping up-to-date with changes in the English language is critical for Paikeday. For example, he can search for "get it together" and "get it all together" by keying in "get" followed by "together" and the computer will find every variant of the phrase occurring in the on-line file.

The benefits of a personal computer to researchers and writers are enormous. "A concordance enables you to see at a glance if there's a flaw in the pattern anywhere," says Paikeday. "The 'Find' routine then helps you comb out the flaws from the entire text or book."

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Scenes like this are common occurrences at Mount Zion Hospital and Medical Center in San Francisco, Calif., where doctors with personal computers at home or in their offices can be linked via telephone modem to the hospital laboratory's minicomputer. Hospital chief of staff Dr. Herman Uhley, and director of clinical laboratories, Dr. Stephen Russell, report that the system helps disseminate patient information quickly and efficiently to doctors who are off-site.

The service, which has been available for the last two and one-half years, allows physicians affiliated with the hospital to have the most current patient information right at their fingertips—just a personal computer and a modem call away. "I can get the report at my office before it's

(continued on page 214)

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(continued from page 211)
even on the hospital floor," says Uhley. "The laboratory data is available as soon as it's entered on the computer."

According to Russell, "The purpose is to make 24-hour-a-day, 7-day-a-week access to laboratory data possible for attending physicians.

"People get sick around the clock, and the clinical lab works around the clock," he says, "so it's a valuable tool for the doctor to be able to view lab data whenever he wants. It extends the capability of a physician to provide first-rate, personal care."

Physicians can now review patient data from home or office to assess whether a visit to the hospital is truly necessary. Doctors are able to load a patient's complete hospital admission record, as well as outpatient records from the previous six months, on their personal computers.

Record accessibility and the ability to review entire laboratory records at one time are both important benefits of the system. "The more data you have in working out the problems of the patient, the better for the patient," says Uhley.

An added boon, according to Russell, is the elimination of transcription errors between the physicians and laboratory technicians, who traditionally interact frequently to share information on patients' test results.

Implementing the system was a natural step in the progression toward computerization of the hospital's laboratory. "This idea simply evolved," Russell says. "It became apparent as we used the modem to troubleshoot computer problems with the software company, and as we became aware of more and more physicians using personal computers at home and in their offices.

"The point is," he continues, "physicians are purchasing personal computers anyway. They have other needs—personal business needs, word-processing needs, billing. And as hospitals buy computers for fiscal and record-keeping reasons, the telephone linkage becomes a practical and useful system to put into operation."

Remote access to a patient's complete hospital records is not expensive for a hospital to implement, Russell says, since physicians buy their own personal computers and modems. "For any hospital which already has the hardware and the lab software, all you're talking about is a relatively inexpensive modem—under $1000."

Before Mount Zion had this setup, physicians with hospitalized patients had two choices: They could come to the hospital, sometimes unnecessarily; or they could hold off on going to the hospital and make the best recommendations with the knowledge they already had about the case. In most hospitals, physicians are still limited to those choices.

But doctors at Mount Zion have another option. "Now instead of worrying about my patients at night," Uhley says, "I resolve the problem by hooking up my Apple II and looking at the patients' lab results."

The Future Is Computer Literacy—At Any Age

When we think of computer education, we typically envision freshly scrubbed seven- and eight-year-olds banging away at the keyboards in their schools, then coming home and proudly expounding at the dinner table on all the computer skills they've mastered. Kids are the future—we hear it all the time—and educating them to be computer literate is vital. But there's another segment of society for which computer education is vital, too, one which is often overlooked when the subject of computer literacy is broached. That group is the elderly.

Peninsula Volunteers Little House, a senior center run by volunteers in Menlo Park, Calif., is a place that emphasizes the importance of continuing education for the elderly. Traditional college-level subjects such as current events and languages are regularly taught at the center. And, since October 1981, a new educational topic has sprung up: computer literacy.

Not just another simplified computer class showing students how to play video games and run preprogrammed software, the class teaches participants to do their own programming. In fact, class instructor Matt Lehmann, 74 years old himself, says proudly, "We haven't bought a dime's worth of software." Class members are too busy writing their own.

When the class first started it comprised only four people who worked on two computers borrowed from ComputerTown, USA, a Menlo Park non-profit organization which promotes computer literacy. But since that time, the roster has grown to more than 100 people. The average age of the students is 65, with the eldest class member being 86. Students now use three 48k Apple IIs donated by Apple, each with a single disk drive and a 40-character monitor. Little House also has a 32k Atari personal computer, given to the center by a private donor.

When asked why senior citizens would want to learn about computer programming, especially when most have left their working days behind them, Lehmann says, "Continued learning is the closest thing we'll ever come to the fountain of youth. People feel younger when they're learning—you've got to keep your brain alive. It's a wonderful mental health program."

The seniors originally started their computer education with a "computer tutor" system, where two students sit side by side and, going through an instruction book, "teach" each other. The system worked wonderfully for local junior high school students, but

(continued on page 218)

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CIRCLE 97

(continued from page 214)
for the seniors it just wasn't clicking. "Seniors need to be treated differently than kids. They don't like learning that way," Lehmann says.

The students wanted more specific lesson plans that they could do independently, so Lehmann started writing "Computer Lessons for Mature Adults" in March 1982—12 programming lessons which form the backbone of the center's weekly 60- to 90-minute classes. The response has been terrific, and now Lehmann is working on 12 more lessons.

As a member of the Peninsula Volunteers Little House senior center, Ed Terry has continued his education by learning how to program an Apple personal computer.

"He's a real genius at writing those things," says Patty McKibbin, one of the original four class members. In fact, it is the switch from the computer tutor to Lehmann's lessons which seems to be responsible for the recent increase in enrollment.

"The most difficult thing for the students to learn," Lehmann says, "is to wear two hats." Not only do they play the part of programmers, inputting commands, but they must also function as users while debugging the program, answering the questions they've programmed. "It's a little hard for them to separate the two. They'll answer the question by mistake when they're programming."

Personal-computer familiarity, according to Lehmann, is an excellent way for the elderly, who are traditionally homebound, to make extra money—whether it's former secretaries and typists doing word processing from home, or retired accountants doing accounting work on their personal computers.

"Almost no matter how handicapped you get, you can still use a computer to stay in touch with the world," Lehmann says. And the extra money these people can earn from being computer literate, he adds, could reduce the financial burden that supporting the elderly often poses for the government.

Lehmann, who is a consultant on coherent optics (lasers) and is also a member of the Menlo Park City Council, acknowledges that many people are apprehensive about learning to use computers. He admits he felt "absolute terror" at the prospect, and bought a personal computer himself so he could "make a fool of myself in the privacy of my own home," he laughs.

"But the more familiar you become with it, the less you're afraid of it," he explains. "It's just another household appliance." He aims to give seniors enough understanding of how computers work to feel confident using preprogrammed software they buy for their own use.

The seniors' hard-earned computer knowledge has reaped a surprise benefit—admiration from their grandchildren. "They're gaining a lot of prestige at home," Lehmann chuckles. But one area in which the seniors have not gained recognition has been in the business community. Lehmann says corporations are missing the boat by not donating equipment to senior centers. Little House, he adds, still does not have any printers, something the computer class needs "desperately," according to McKibbin.

"They're all helping kids, but they're not helping the elderly," Lehmann says. "Assisting senior centers would benefit the companies. You couldn't find a better sales organization—the computers people learn on are the ones they buy." He estimates that about 15 percent of his students have bought their own personal computers; most of them purchased the machines on which they learned.

Lehmann is excited about the center's computer program and the new skills his pupils are gaining. "I want the students to have to think—not only to gain the manual dexterity that comes from learning games, but to learn to think logically."

McKibbin agrees. "Many of these people have their Ph.D.s," she says. "What else is there for them to do—play a little golf, do a little gardening? This is a new type of thing for them to master. It gives them a big bang from learning something. It has really taken hold."

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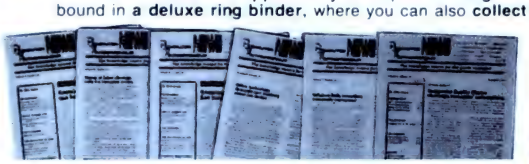

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CIRCLE 61

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3	DATE	Time between dates
4	DAYYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEVN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDDB	Double declining balance depreciation
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18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
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24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNUDEF	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEPLETE	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model-i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPROF	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQUOQ	Fixed quantity economic order quantity model
53	FQEOWSH	As above but with shortages permitted
54	FQEOQPB	As above but with quantity price breaks
55	QUEUECB	Cost-benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project
59	WACC	Weighted average cost of capital
60	COMPBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
70	FUPRINF	Future price estimation with inflation
71	MAILPAC	Mailing list system
72	LETWRT	Letter writing system-links with MAILPAC
73	SORT3	Sorts list of names
74	LABEL1	Shipping label maker
75	LABEL2	Name label maker
76	BUSBUD	DOME business bookkeeping system
77	TIMECLCK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMUSAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign.
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
88	ARBCOMP	Arbitrage computations
89	DEPRSF	Sinking fund depreciation
90	UPSZONE	Finds UPS zones from zip code
91	ENVELOPE	Types envelope including return address
92	AUTOEXP	Automobile expense analysis
93	INSFILE	Insurance policy file
94	PAYROLL2	In memory payroll system
95	DILANAL	Dilution analysis
96	LOANAFFD	Loan amount a borrower can afford
97	RENTPRCH	Purchase price for rental property
98	SALELEAS	Sale-leaseback analysis
99	RRCONVBD	Investor's rate of return on convertable bond
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More News On Statistical Packages

On page 37 of the June 1983 issue, you had a question about statistical packages available for personal computers. Your readers may be interested in knowing that two popular mainframe statistical packages are being adapted for personal computers.

A version of SPSS (Statistical Package for the Social Sciences) will be available soon for the DEC Professional 350. Contact SPSS Inc., Suite 3000, 444 N. Michigan Ave., Chicago, IL 60611; (312) 329-2400. Another well-known package, BMDP, is available on a Motorola 68000-based machine called the BMDP StatCat microcomputer. The hardware and software are both available through the BMDP people. A recent newsletter also mentioned that BMDP software may be adapted to other 68000-based machines. Contact BMDP Statistical Software, 1964 Westwood Blvd., Suite 202, Los Angeles, CA 90025; (213) 475-5700.

Finally, a listing of statistical packages available for personal computers was printed in the February 1983 issue of *The American Statistician*, on pages 83 through 86. While this list may already be outdated, the author may have an updated version. I have also been compiling a similar list, and am working on an evaluation of statistical packages for the Apple II. I would be glad to share any information with other readers.

Stephen D. Simon
DEPARTMENT OF APPLIED STATISTICS
AND OPERATIONS RESEARCH
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AN UPDATE ON DESK-MANAGEMENT SOFTWARE

It was a pleasure to see the many positive things you had to say about our product, the Desk Organizer, in the June story, "Time Is Of The Essence (page 56). While our product is not a time-management package in the strict sense, we do feel that you fairly identified our contributions in that arena.

One minor correction is in order. While the presence of a clock card does provide for automatic initialization of the clock at system start-up and is therefore a great convenience, the system will permit users without such boards to set the clock themselves.

By the way, on July 1 we are releasing an enhancement which will let Mr. Duncan run dBASE II (and most other PC programs) alongside the Desk Organizer. A single keystroke will allow him to move quickly from one program to the other and if an alarm goes off while he is using his statistical data base, he will still hear about it.

Again, our thanks for your discussion of our product. We believe that desk-management software is of increasing interest to the new computer owner and that your magazine is performing a service in discussing the assumptions and the products which are creating this important new genre.

Fred Collopy
PRESIDENT
CONCEPTUAL INSTRUMENTS
PHILADELPHIA, PA

AN EXCITING FUTURE FOR COMPUTER TYPESETTING

The article, "Professional Typesetting With Your Computer," in the June issue (page 105) was read here with particular interest because it mentioned our company.

The article does a very good job of describing the sophisticated technology exemplified by such industry leaders as Shaftstall, and we are very grateful to have been mentioned as a low cost alternative.

But mere cost is not the end of the story. For most microcomputer owners, the essence of microcomputers is independence: independence from outside suppliers, independence from time constraints. Cybertext has been credited with having created the market for microcomputer-typesetting interfaces. We were the first and have probably the largest installed base of any microcomputer interface system, probably more than all the other newer systems put together.

We believe microcomputers are changing the world. We have experienced the profound changes in our own lives. And we are now observing the changes that micros and micro-oriented products such as our microCOMPOSER are making in the world of typesetting.

Telephone communication is the most dramatic of the new possibilities. When our customers first grasp the idea that they can set type by telephone, they and their businesses are suddenly transformed.

For the present, typesetting equipment is too slow or too expensive to make instant books a reality. But in a year or two or three, laser technology will become economical enough to allow small publishers to do books on demand. We may even see in this decade orders placed in book stores equipped to accept immediate electronic delivery from the publisher. Were that to become common practice, the relief it would offer from the curse of inventory control would totally restructure book publishing and book selling.

Gerald Kaminski
PRESIDENT
CYBERTEXT CORPORATION
ARCATA, CA

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."

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4	29	54	79	104	129	154	179	204	229	254	279	304	329	354	379	404	429	454	479	504	529	554	579	604	629	654	679	704	729	754	779
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6	31	56	81	106	131	156	181	206	231	256	281	306	331	356	381	406	431	456	481	506	531	556	581	606	631	656	681	706	731	756	781
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9	34	59	84	109	134	159	184	209	234	259	284	309	334	359	384	409	434	459	484	509	534	559	584	609	634	659	684	709	734	759	784
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14	39	64	89	114	139	164	189	214	239	264	289	314	339	364	389	414	439	464	489	514	539	564	589	614	639	664	689	714	739	764	789
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19	44	69	94	119	144	169	194	219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594	619	644	669	694	719	744	769	794
20	45	70	95	120	145	170	195	220	245	270	295	320	345	370	395	420	445	470	495	520	545	570	595	620	645	670	695	720	745	770	795
21	46	71	96	121	146	171	196	221	246	271	296	321	346	371	396	421	446	471	496	521	546	571	596	621	646	671	696	721	746	771	796
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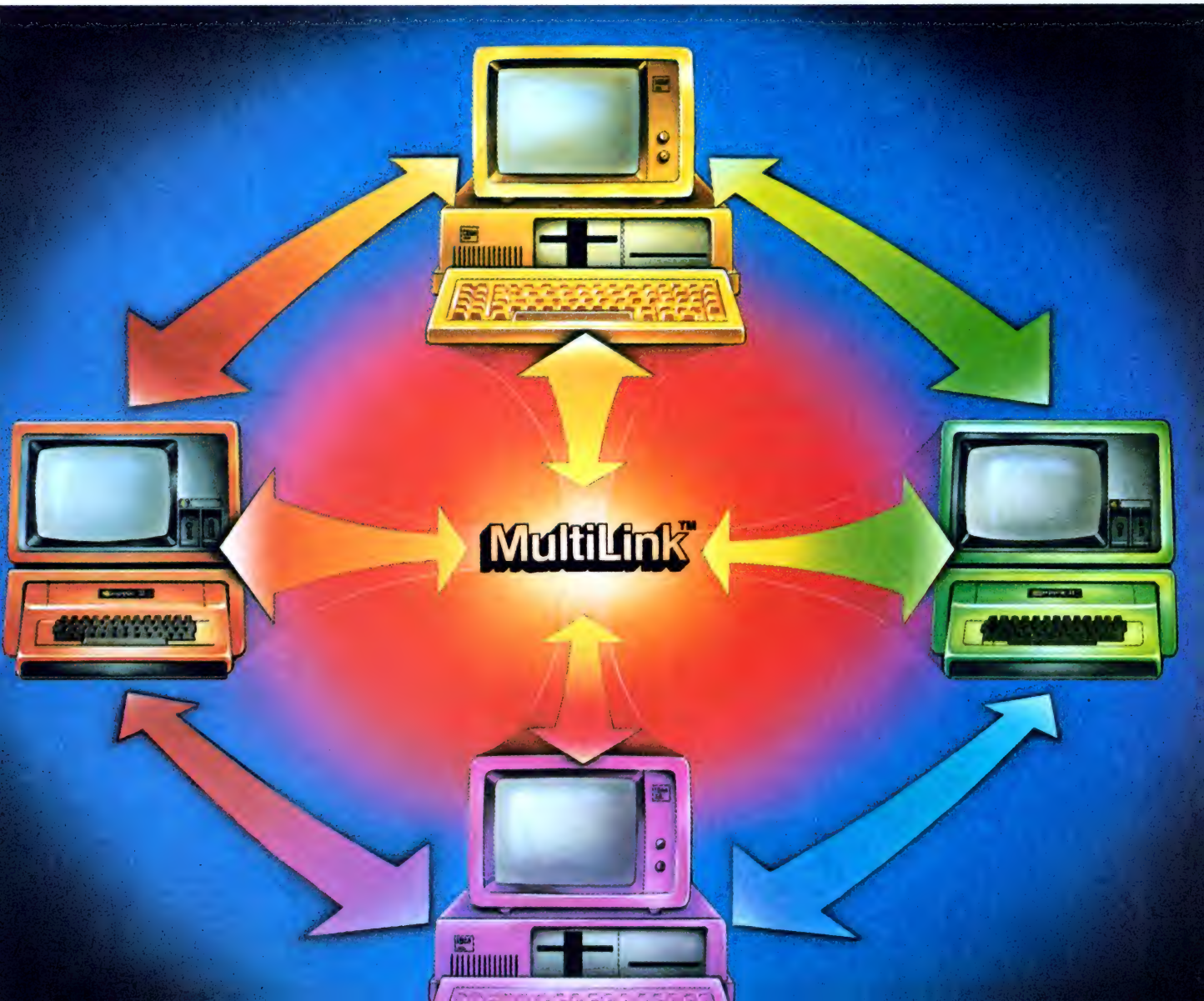

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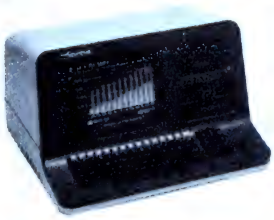

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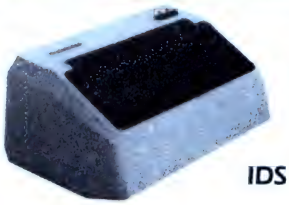

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$2995
Columbia Data Products, Inc.
Columbia, MD 21045
retail
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Cromemco CS-3A
is a series of general purpose systems offering expansion capability for multiuser, multitasking applications in business, engineering, science, and education. The basic system has a Z80A processor, 64k of memory, and two 8-inch Tandon disk drives, providing a total of 2.4Mbytes of disk storage. The dual processor option provides two CPUs—the 68000 and the Z80A—giving access to a large software base and performance for demanding tasks. The CS-3A has 21 card slots and a line of bus-compatible boards, letting the user configure it for many applications.

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(continued on page 234)

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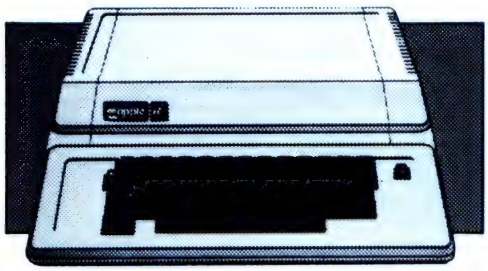

APPLE IIe 64K, 40 COLUMN	**$1,175**
APPLE IIe 128K, 80 COLUMN	**$1,395**
APPLE IIe, STARTER SYSTEM BY APPLE (System A)	
64K and 80 column	
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WARRANTY is 100% Parts and Labor for 90 days by us.

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To add on Micro-Sci A2 Drive to above, add $245. (System DD)

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	Controller Card for A2 Drive	$ 100	$ 79
	★A40, 5-1/4", 160K Disk Drive	$ 449	$ 299
	★A70, 5-1/4", 286K Disk Drive	$ 599	$ 299
	Controller for A40 or A70	$ 100	$ 79
	Filer, Disk Utility Software	$ 20	$ 15
VISTA	Solo, 5" 143K Disk Drive Std. Height	$ 300	$ 249
	Duet, 5", Double Sided, 320K Half Height	$ 420	$ 329
	Quartet, 5", 2 Duets Side by Side or Standard Cabinet	$ 715	$ 575
	Controller Card	$ 89	$ 75
	★V1000 Dual 8", Std. Format w/Controller, Complete	$2195	$1295
TEAC	*143K Disk Drive, 1/2 High	$ 379	$ 279
	Controller Card.	$ 89	$ 69
	*Electronics by ComX		
★ CENTRAL POINT, Filer, Utility and DOS 3.3		$ 20	$ 15

HARDWARE
for Apple II

RAM EXPANSION

	LIST PRICE	OUR PRICE
★ **ComX**, for IIe, 80 col. 64K Adder Card	$ 295	$145
★ **ComX**, RAM Card, 2 Yr. Wty (II+) 16K	$ 179	$ 39
★ **ALS**, ADDRam (II+) 16K	$ 100	$ 69
★ **Microsoft**, RAMCard (II+) 16K	$ 100	$ 79
★ **Saturn Systems**, RAM Card (II+) 32K	$ 249	$169
RAM Card (II+) 64K	$ 425	$319
RAM Card II(+) 128K	$ 599	$459
★ **Axlon RAM Disk System** (+ or e) 320K	$1395	$795

VIDEO CARDS

★ **ALS**, Smarterm II (+ or e)	$ 179	$139
ComX, 80 col./64K Adder (IIe)	$ 295	$145
Videx, Videoterm 80 col. (+ or e)	$ 345	$229
★ UltraTerm (+ or e)	$ 379	$279
Soft Video Switch (II+)	$ 35	$ 25
Enhancer II (II+)	$ 149	$ 99
Function Strip (II+)	$ 79	$ 59
Full Videx Line. Call. Up to 35% off.		
Vista, Vision 80	$ 289	$199

MISCELLANEOUS

ALS, The CP/M Card V3.0 (+ or e)	$ 399	$299
Z-Card (+ or e)	$ 169	$129
Color II (+ or e)	$ 179	$139
ASTAR, RF Modulator	$ 35	$ 25
CCS, Serial Interface 7710A	$ 150	$129
Dan Paymar, Lower Case Chip (II+)	$ 50	$ 39
Don't Ask, DAO 003 S.A. Mouth	$ 125	$ 85
★ **Eastside**, Wild Card, copier	$ 130	$ 99
Kensington, System Saver	$ 90	$ 69
Key Tronic, KB200 keyboard, 84 keys (II+)	$ 298	$198
Kraft, Joystick (Ap II/II+)	$ 65	$ 49
Paddle (Ap II/II+)	$ 50	$ 39
M&R, Sup R fan	$ 50	$ 39
★ **Microsoft**, Z80 Softcard (+ or e)	$ 345	$235
Z80 Softcard Plus (+ or e)	$ 645	$459
Softcard Premium Pack (II+)	$ 695	$495
Softcard Premium Pack (IIe)	$ 495	$395
Micro Tek, Dumpling 64, Buffer	$ 349	$269
★ **Orange Micro**, Grappler Plus	$ 165	$119
Practical Peripherals:		
MBP IIe 64K Par. (Epson Internal) (+ or e)	$ 279	$209
MBS IIe 32K Ser. (Epson Internal) (+ or e)	$ 219	$169
Microbuffer II+, 16K, (+ or e) Par/Ser (specify)	$ 259	$199
Microbuffer II+, 64K, (+ or e) Par/Ser (specify)	$ 349	$259
PCPI, Appli-Card, 14 features 4 Mhz	$ 295	$235
6 Mhz	$ 375	$275
RH Electronics, Super Fan II	$ 75	$ 59
★ **Saturn Systems**, Accelerator II	$ 599	$449
SSM, A10 II, Serial/Para Interface	$ 225	$169
TG Products, Game Paddles (II+)	$ 40	$ 29
Joystick (II+)	$ 60	$ 45
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Trak Ball (II+)	$ 65	$ 44
Videx, PSIO, Para. Ser Interface	$ 229	$169
WICO, Trackball (Ap II/II+)	$ 90	$ 61
Analog Joystick	$ 70	$ 47

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on disk for Apple II/II+/IIE

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Apple Computer, Inc. 50% off list, on Apple Inc. software			Call
Applied Soft Tech., VersaForm		$ 389	$265
Artsci, MagicWindow II	NEW!	$ 150	$ 99
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Info. Unlim., Easywriter (PRO)		$ 175	$119
LJK, Letter Perfect w Mail Merge		$ 150	$ 99
★ **Micro Craft**, (requires Z80 CP/M-Card) Professional Billkeeper		$ 995	$469
Verdict, (Legal Billing)		$ 995	$469
★ **Micro Lab**, Tax Manager		$ 180	$119
Micro Pro, (all require Z80-CP/M Card)			
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SpellStar™	SPECIAL	$ 250	$129
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Financial, Multitool (CP/M or DOS)		$ 100	$ 75
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General Manager II	NEW!	$ 230	$155
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Statistics and Math Programs		$ 100	$ 49
Practical Basic Programs (40 each)		$ 100	$ 49
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Series 9 Text & Spell & Mail, all 3		$ 595	$395
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Perfect Speller		$ 295	$129
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Perfect Filer		$ 595	$259
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Sensible, Sens. Speller, specify version		$ 125	$ 85
★ **Silcon Valley**, Word Handler		$ 250	$139
Sof./Sys., Executive Secretary		$ 250	$169
Executive Speller		$ 75	$ 55
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Visicalc 3.3		$ 250	$169
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★ Copy II Plus (bit copier)		$ 40	$ 35
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★ **ComX**, 16K RAM Card, 2 Yr. Warranty, for II+	$ 179	$ 39
M&R, SupRterm 80 col. for II+	$ 375	$199
MicroCom, Micro Courier	$ 250	$125
Micro Telegram	$ 250	$125
Micro-Sci, A70, 5 1/4" 286K Disk Drive	$ 599	$299
Microsoft, 16K RAMCard for II+	$ 100	$ 79
Saturn Systems, 32K RAM Card for II+	$ 249	$169
Silicon Valley, Word Handler	$ 250	$139
Videx, Videoterm, 80 column card for II+	$ 345	$229

SYSCOM II
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Note: Substitutions and deletions same as System B apply. Syscom 2 is software and hardware compatible to the Apple II+.

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(continued from page 230)

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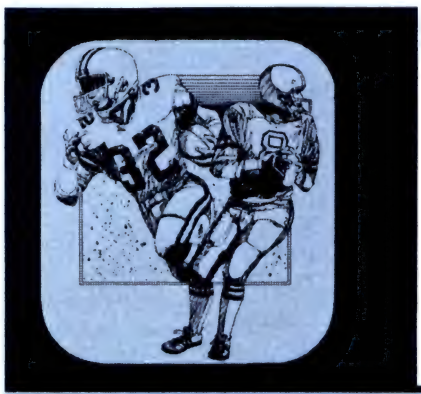
(continued on page 238)



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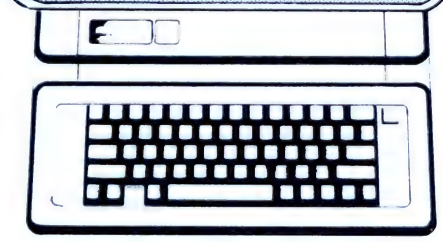

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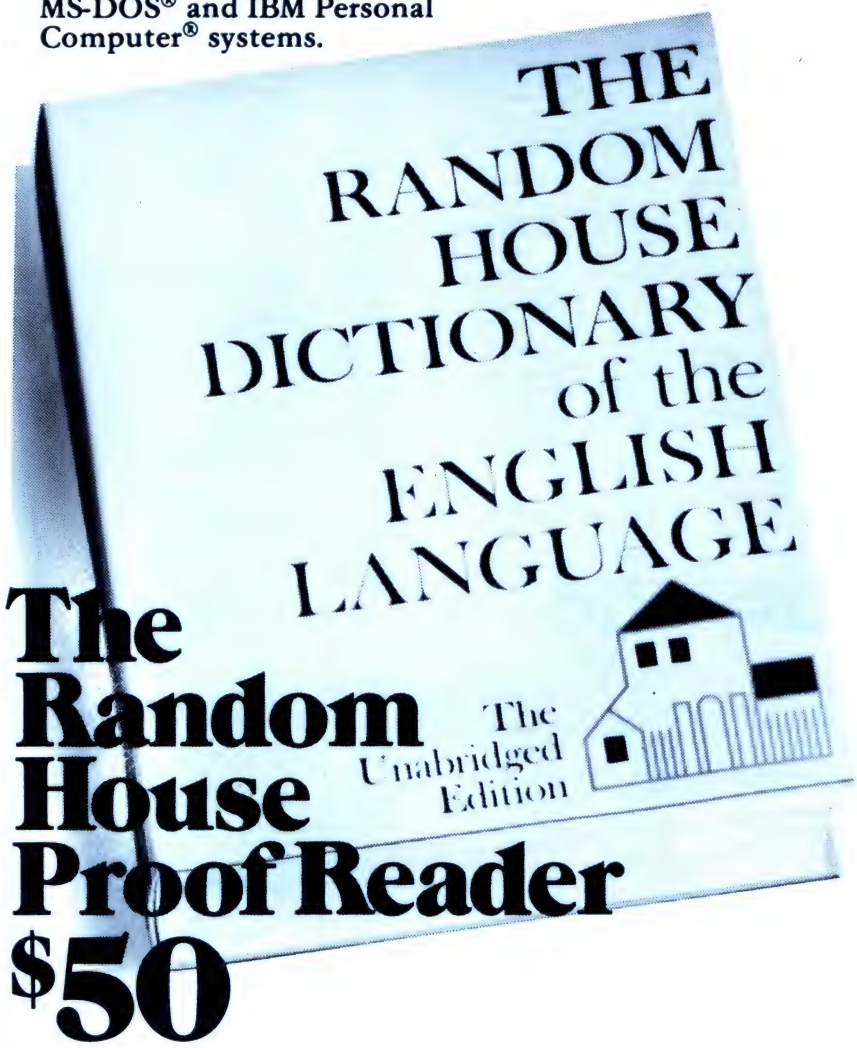

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CIRCLE 133

(continued from page 234)

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(continued on page 242)

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(continued from page 238)

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play, a printer port, modem port, Winchester disk expansion port, and detached 93-key keyboard. The unit comes with the following software: MultiPlan spreadsheet, WordStar 3.3 word processor, MailMerge 3.3 form letter processor, GSS-Graph graphics package, GSX-80 graphics device driver, CBASIC language, a DEC VT-100 terminal emulation package, and the CP/M Plus operating system.
$2695
Visual Technology Incorporated
Tewksbury, MA 01876
retail or mail order
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Xerox 16/8
is designed to be used as a standalone unit or as a workstation in an office communications network. It has 8- and 16-bit microprocessors, each with its own memory, and can use both of them concurrently. The 8-bit processor has 64k memory and the 16-bit one has an expandable base of 128k. The system includes CP/M and MS-DOS operating systems, and network and communications options.
$3395 to **$5295** depending on disk storage capacity
Xerox Corporation
Dallas, TX 75247
retail
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Zues4
is the smallest personal computer in OSM's line, and it is designed as a multiuser, multiprocessor business system. A basic single-user system has 64k RAM, 6.3Mbytes of Winchester disk storage, and a 250k floppy disk drive.
$4595
$995 per user increment for two-user and four-user configurations
OSM Computer Corporation
Mountain View, CA 94043
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Amlyn Model 1560
is a high density mini-floppy disk drive which provides up to 3.3 Mbytes of unformatted capacity, using double sided recording at a density of 9500 bpi, at 170 tracks per inch over 160 tracks on each side of the diskette. It's compatible with a Shugart Associates SA460 mini-floppy drive or its equivalent, except that it has a 500 kbit data transfer rate.
$595
Amlyn Corporation
San Jose, CA 95131
retail
CIRCLE 486

Amlyn Model 1860
is similar to the Model 1560 drive and provides up to 3.2 Mbytes of unformatted data capacity, using double sided recording at a density of 9500 bpi, at 170 tracks per inch over 154 tracks on each side of a floppy disk. Its interface is compatible with that of the Shugart Associates SA850 maxi-floppy drive or its equivalent.
$595
Amlyn Corporation
San Jose, CA 95131
retail
CIRCLE 487

AMDISK-1
is a compact 3-inch micro-floppy disk drive system with up to 286k of formatted storage capacity which is compatible with the recording format, data transfer rate, and disk rotation speed of the Apple II floppy disk drives.
$299
AMDEK Corporation
Elk Grove Village, Il 60007
retail
CIRCLE 488

ComFiler
is a $5\frac{1}{4}$-inch Winchester disk drive for the Epson QX-10 computer. It has 10 Mbytes of fast-access storage capacity and has the capacity to store more than 7000 pages of double-spaced typewritten text.
$2295
Comrex International, Inc.
Torrance, CA 90505
retail
CIRCLE 489

CR-1000 ComDrive
is a dual floppy disk drive which is plug-compatible with Apple Computers and provides 286k of formatted capacity in a single, low-profile package. It replaces two standard Apple floppy drives of 143k capacity while occupying half the space.
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with an average access time of 40 milliseconds. Three slave drives in any capacity can be added to provide up to 128 Mbytes of on-line data storage. These are compatible with most computers including the IBM Personal Computer or XT; Apple II, IIe; Osborne 1.
$3295 to $3995
Davong Systems
Sunnyvale, CA 94086
retail
CIRCLE 492

Digital RD51
is a 5¼-inch, 10-Mbyte Winchester-technology disk for DEC's small business and personal computer systems. It interfaces with the Professional 350 personal computer and the MICRO/PDP-11 computer. It has 345 tracks per inch with a density of 9074 bits/inch and a peak data transfer rate of 5Mbits/second.
$1695
Digital Equipment Corporation
Maynard, MA 01754
retail
CIRCLE 493

Disctron D-1100
is an 8-inch Winchester fixed disk drive with a capacity of 121.9 Mbytes unformatted, and 111.5 Mbytes formatted with an average access time of 35 milliseconds.
$1735
Disctron, Inc.
Milpitas, CA 95035
retail
CIRCLE 494

DSC 50X
is a ¼-inch cartridge tape streaming subsystem which has a total formatted capacity of 45 Mbytes, and 48.6 Mbytes unformatted on nine tracks. It has a recording density of 8000 bits per inch with a transfer rate of 5 Mbytes per minute. It can be used as an alternative to disk backup systems available for the IBM Series/1.
$5000
DATUM, Inc.
Anaheim, CA 92806
retail
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PC-Mate Bak-Pak
is a 6.25 Mbyte formatted disk pack that simplifies the process of preparing backups of program and data files on the IBM Personal Computer. It contains five high-density floppy diskettes and the system may be configured to appear to the DOS(2.0) as either a single 6.25

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is a 13.4 Mbyte formatted Winchester tabletop start-stop cartridge tape backup system, and provides a three-minute-per-Mbyte backup rate on a file-by-file basis.
$3695
SCI-COM Computer Systems
Bridgewater, NJ 08807
retail
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SooperSpooler
is a buffer/interface that can stack sentences, paragraphs, data tables, or graphics from different programs in SooperSpooler's memory in any order and then print the finished document. It can interface otherwise non-compatible computers and printers since it is available with both parallel and serial I/O ports.
$349
Consolink Corporation
Longmont, CO 80501
retail
CIRCLE 538

SYSGEN IMAGE
is a streaming cassette tape backup for the IBM XT. It includes a controller, drive electronics, and tape drive and is software compatible with either PC-DOS or CP/M. It has a storage capacity of 20 Mbytes.
$995
SYSGEN Inc.
Fremont, CA 94539
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TD-1012/PC-STR
is a half-inch magnetic tape subsystem for the IBM Personal Computer and XT, which uses the TD-1012 transport in both the start/stop and streaming modes and includes basic application software. It has a data transfer rate of 20k per second in the start/stop mode and 160k in the streaming mode.
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Tecmar Mass Memory Drives
are five versions of mass memory storage in a mini-cabinet package. These include 10 Mbyte, 15 Mbyte, and 26 Mbyte formatted storage Winchester disks; a 5 Mbyte removable-cartridge Winchester; and a 6.25 Mbyte multiple-floppy-stack drive recommended for backup of programs on hard disk systems.
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$2895—15 Mbyte
$3995—26 Mbyte
$1595—6.25 Mbyte
Tecmar Inc.
Cleveland, Ohio 44122
retail
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Xebec 9710
is a 5.25-inch Winchester disk drive subsystem which is compatibile with all personal/professional microcomputers and offers features such as a multisector transfer that automatically switches to the next track when necessary, and a full-sector data buffer.
$2200
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Altos II Smart Terminal
is tailored for business applications. It features a 14-inch screen with wide-format 132-column capability, fast two-page memory, and programmable function keys. It has a tilting display and a detached keyboard with an 18-key keypad.
$995
Altos Computer Systems
San Francisco, CA 94114
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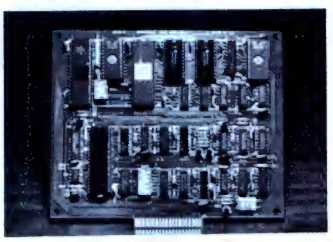
CIRCLE 543

CADCO C-300
is a microprocessor-controlled, conversational video display terminal that features a detachable keyboard and a 14-inch screen that displays green characters on a black background. The screen displays 24 lines of 80 characters plus an 80-character status line which provides

VIDEO TERMINAL BOARD 82-018

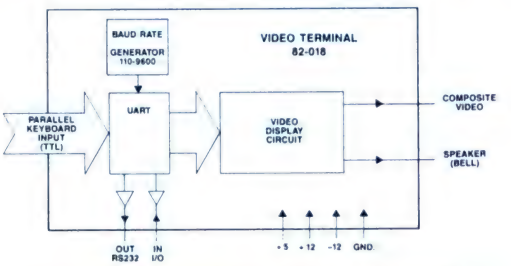
This is a complete stand alone Video Terminal board. All that is needed besides this board is a parallel ASCII keyboard, standard NTSC monitor, and a power supply. It displays 80 columns by 25 lines of UPPER and lower case characters. Data is transferred by RS232 at rates of 110 baud to 9600 baud — switch selectable. The UART is controlled (parity etc.) by a 5 pos. dip switch.



Complete source listing is included in the documentation. Both the character generator and the CRT program are in 2716 EPROMS to allow easy modification to your needs.

This board uses a 6502 Microprocessor and a 6545-1 CRT controller. The 6502 runs during the horz. and vert. blanking (45% of the time). The serial input port is interrupt driven. A 1500 character silo is used to store data until the 6502 can display it.

Features
- 6502 Microprocessor
- 6545-1 CRT controller
- 2716 EPROM char. gen.
- 2716 EPROM program
- 4K RAM (6116)
- 2K EPROM 2716
- RS232 I/O for direct connection to computer or modem.
- 80 columns x 25 line display
- Size 6.2" x 7.2"
- Output for speaker (bell)
- Power +5 700Ma. +12 50Ma. -12 50Ma.



This board is available assembled and tested, or bare board with the two EPROMS and crystal.
Assembled and tested #82-018A $199.95
Bare board with EPROMS and crystal #82-018B $ 89.95
Both versions come with complete documentation.

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$1250
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Pennsauken, NJ 08109
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PANASONIC DT-D1300D and DT-1000G
are compatible with the IBM Personal Computer, Apple III, Panasonic JR-200, and other popular computers. The DT-D1300D is an RGB monitor incorporating data grade picture tubes. It can generate 16 colors on the 13-inch screen. The DT-D1000G is similar to the DT-D1300D but offers a 10-inch screen.
$540—DT-D1300D
$440—DT-D1000G
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Secaucus, NJ 07094
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PRINCETON GRAPHIC HX-12
is a high-resolution, RGB monitor for the Apple IIe. It provides an 80-column text capability and complete Apple IIe software compatibility is retained.
$185
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Princeton, NJ 08540
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QUAZON Quick-Link 300
is a personal communications videotex terminal designed to allow users to tap into a host of nationwide information and computer-services. It requires a telephone line and a television for hookup.
under **$200**
Quazon Corporation
Carrollton, TX 75006
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CIRCLE 548

SAKATA SC-100
is a monitor compatible with Apple II, Apple III, Atari 800, Commodore 64, IBM Personal Computer, NEC PC, Osborne, TI-99, and other personal computers. It features a 13-inch screen and a composite video signal to produce clear, sharp graphics and copy in eight colors.
$329
SAKATA U.S.A. Corporation
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TAB Model 132/15H
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$2200
Tab Products
Palo Alto, CA 94304
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CIRCLE 550

Televideo Models 915 and 924
terminals feature low profile, detachable keyboards and high resolution, tilt and swivel screens. They offer split screen mode and non-volatile programmable function keys. Model 915 has up to two pages of memory to facilitate off-line editing. Model 924 has four pages of memory capacity.
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$895—Model 924
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CIRCLE 553

Brother HR-15
is a two-color daisywheel printer and prints in red and black. It features 3k memory that retains information even when off-line and offers 10,12,15 pitch and proportional spacing. It prints in two directions at almost 800 characters per minute.
$599
Brother International
Piscataway, NJ 08854
retail
CIRCLE 554

C.Itoh Models 8510S and 1550S
are high-speed printers that offer two speeds: 120 cps at 70 lpm and 180 cps at 100 lpm. The speeds are both DIP switch and software selectable. The 8510S has an 80-character-per-line format and the 1550S has a 136-character-per-line format.
$825—8510S
$1225—1550S
C. Itoh Electronics
Los Angeles, CA 90066
retail
CIRCLE 555

ComRiter CR-II
is a daisywheel printer for microcomputers that offers superscript, subscript, backspace, underline, boldface, doublestrike, and proportional spacing. It features a 5k buffer to reproduce original and multiple copies of documents stored in its memory.
under **$700**
Comrex International, Inc.
Torrance, CA 90505
retail
CIRCLE 556

Centronics Linewriter 400
is the first of a series of compact, third-generation band printers offering typewriter quality printing. It has a built-in diagnostics system that constantly monitors the status of the printer and accurately identifies errors and required action.
under **$5000**

Centronics Data Computer Corp.
Hudson, NH 03051
retail
CIRCLE 557

GE 3000 PC Series
consists of two tabletop printers, the GE 3014 and 3024. They are personal computer system-compatible. The GE 3014 prints at 80 cps in the memo mode and 40 cps in the near letter quality mode. The GE 3024 operates in a 100-cps memo mode and a 50-cps near letter quality.
$1350—GE 3014
$1550—GE 3024
General Electric
Waynesboro, VA 22980
retail
CIRCLE 558

IBM XY/749 Digital Plotter
is a high precision, eight-pen digital plotter that generates vectors, circles and arcs, axes, and pointmarks as well as all 96 ASCII characters. It is compatible with most mainframe, mini, and personal computers.
$1995

IBM Instruments, Inc.
Danbury, CT 06810
retail
CIRCLE 559

Smith-Corona Memory Correct III Messenger
is a typewriter/printer that can serve as a letter-quality computer printer by plugging its optional messenger module into a personal computer. It uses daisy printwheels and offers 10 different styles of type.
$599—Memory Correct III
$170—Messenger Module
Smith-Corona
New Canaan, CT 06840
retail
CIRCLE 560

Strobe Model 260
is a graphics plotter allowing the user to plot graphs and charts utilizing up to six different colors with automatic pen changes. Software enables the user to preselect colors before initialing the plot. It includes an intelligent RS-232 interface.
$995

Strobe, Inc.
Mountain View, CA 94043
retail
CIRCLE 561

COMMUNICATIONS

Comrex CR-103
is a modem compatible with the Epson QX-10 computer. It offers automatic answering, automatic dialing, one-key redial, and a speaker for audio monitoring off-line data. It can be used with the MCI or Sprint phone systems.
$159.95
Comrex
Torrance, CA 90505
retail
CIRCLE 562

Corvus Omninet Interface
is now available for DEC Rainbow 100 computers. The interface transporter card gives DEC Rainbow 100 users the benefits of Omninet. It is a simple low-cost connection to as many as 63 other personal computers or peripheral devices over a distance up to 4000 feet. Data

(continued on page 256)

Hewitt's National Wholesale

Syscom III, Apple - compatable, 64K, Numeric Keypad
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Columbia Multi - Personal Computer.....$3225.00
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Commodore 64..... 435.00
Eagle 1630, IBM - compatable, 10 MB HD,
128K RAM..... 5197.00
North Star Advantage..... 2770.95
Olivetti M-20 (in house only)..... call
Osborne I..... 1567.50
Osborne Executive..... 2495.00
Toshiba T-100, 64K, CP/M..... 629.95

Printers
Gemini 10..... 315.00
Okidata ML82A..... 412.50
ML-84.....1023.00
Toshiba P1350.....1567.50
Transtar 140..... call
Diablo 620..... 935.00
Smith - Corona TP-1..... 624.00

Modems
Anchor Signalman MK I..... 75.95
MK VII AD/AA..... 104.95
MK VIII 300/1200 Baud..... 263.50
Hayes Smartmodem 1200B..... 493.95
Novation Smartcat 103/212.... 457.95

Software
IBM, Apple, Commodore, CP/M Atari,
T.I., others.....call

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Fourth Dim. Parallel Printer
Card..... 75.00
Kensington System Saver Fan... 65.95
Microsoft Softcard..... 272.50
Microtek Apple Dumpling Card.. 92.50
Orange Micro Grappler +..... 130.00
Videx Videoterm..... 239.95

Commodore Peripherals
Cardco, Data - 20, Midwest Micro,
Scientific Micro, Skyles Electric,
others,.....çall

IBM Peripherals
Seattle, STB, Tecmar, Wesper Micro,
Quadram, Apparat, others.....call

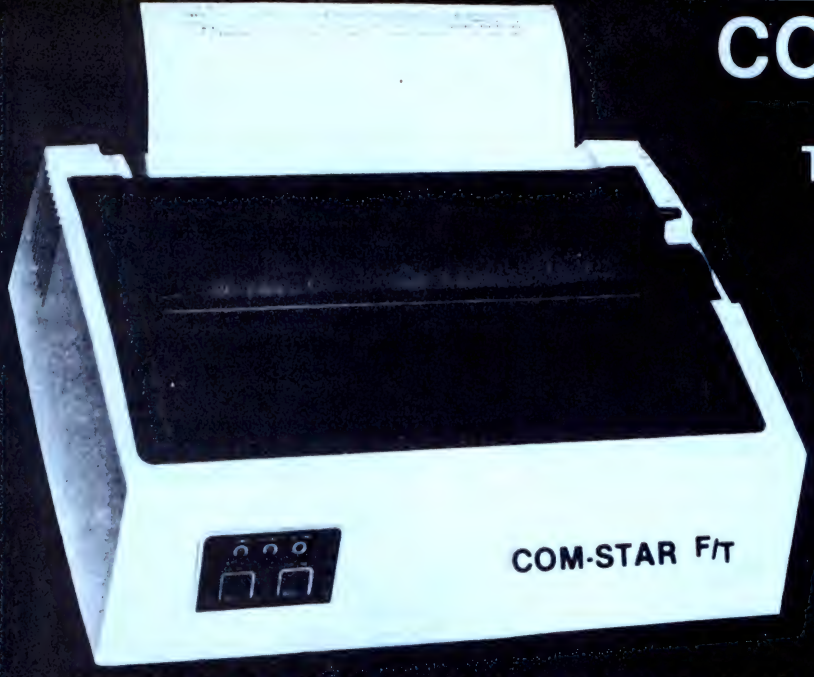
Monitors
Amdek Color I.....$299.95
NEC JC1212..... 299.95
Taxan 12" Green..... 108.95
USI 12" Amber..... 141.95

Hewitt's National Wholesale
2448 Menaul N.E. Alb., N.M. 87107
N.M. 505-883-0984
1-800-821-9287

CIRCLE 157

COM-STAR F/T

Tractor Friction Printer



only $259

• Lowest price quality tractor friction printer in the U.S.A. • Fast 80 characters per second
• 40, 46, 66, 80, 96, or 132 characters per line spacing • Prints labels, letters, graphs, and tables
• List your programs • Print out data from modem services

Deluxe COMSTAR F/T PRINTER — $259.00

The Comstar is an excellent addition to any micro-computer system. (Interfaces are available for Apple, VIC-20, Commodore-64, Pet, Atari 400 and 800, and Hewlett Packard). At only $259 the Comstar gives you print quality and featuers found only on printers costing twice as much. Compare these features.

• **BI-DIRECTIONAL PRINTING** with a LOGIC SEEKING CARRIAGE CONTROL for higher through-put in actual text printing. 80 characters per second.

• **PRINTING VERSATILITY:** standard 96 ASCII character set plus block graphics and international scripts. An EPROM character generator includes up to 224 characters.

• **INTERFACE FLEXIBILITY:** Centronics is standard. Options include EIA RS232C, 20mA Current Loop. (Add $20.00 for RS232)

• **LONG LIFE PRINT HEAD:** 100 million character life expectancy.

• **THREE SELECTABLE CHARACTER PITCHES:** • 10, 12 or 16.5 characters per inch. 132 columns maximum. Double-width font also is standard for each character pitch.

• **THREE SELECTABLE LINE SPACINGS:** 6, 8 or 12 lines per inch.

• **PROGRAMMABLE LINE FEED:** programmable length from 1/144 to 255/144 inches.

• **VERTICAL FORMAT CONTROL:** programmable form length up to 127 lines, useful for short or over-sized preprinted forms.

• **FRICTION AND TRACTOR FEED:** will accept single sheet paper.

• **224 TOTAL CHARACTERS**

• **USES STANDARD SIZE PAPER**

If you want more try —

Premium Quality COMSTAR F/T SUPER-10" PRINTER — $299.00

More Features Than MX-80

For $299 you get all of the features of the Comstar plus 10" carriage 120 cps, 9x9 dot matrix with double strike capability for 18 x 18 dotmatrix. High resolution bit image (120 x 144 dot matrix), underlining, backspacing, 2.3K buffer, left and right margin settings, true lower descenders, with super and subscripts, and prints standard, Italic, Block Graphics, special characters, plus 2K of user definable characters. For the ultimate in price performance the Comstart F/T Super 10" leads the pack!

80 COLUMN PRINTER $189

Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal roll paper!

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We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge via United Parcel Service, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

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lmn opqrstuvwxyz 1234567890
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SUPER-10"

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

CIRCLE 142

Commodore - 64 Word Processors

SCRIPT 64 EXECUTIVE WORD PROCESSOR

Rated best by COMMODORE. This is the finest word processor available. Features include line and paragraph insertion/deletion, indentation, right and left justification, titles, page numbering, characters per inch, etc. All features are easy to use and understand. With tabs, etc. SCRIPT-64 even includes a dictionary/spelling checker to make sure your spelling is correct. The dictionary is user customizable to any technical words you may use. Furthermore, all paragraphs can be printed in any order so doctors, lawyers, real estate agents, and homeowners will find contract writing and everyday letters a snap. To top things off, there is a 100 page manual and help screens to make learning how to use SCRIPT-64 a snap. This word processor is so complete we can't think of anything it doesn't have. When combined with the complete database you have a powerful mailmerge and label program that lets you customize any mailing list with personalized letters. List $99.95. Sale $79.00. (plus postage) Disk Only.

COMPLETE DATA BASE

This is a user friendly database that makes any information easy to store and retrieve. The user defines the fields and then can add change, delete and search for any category he wants. When combined with the SCRIPT-64 Executive Word Processor you can search out any category (zip codes, hair color, etc.) and print super personalized letters. List $89.00. Sale $69.00. (plus postage) Disk Only.

TOTAL WORD PROCESSOR PLUS 5.2

This top quality word processor was specially designed for PROTECTO ENTERPRIZES. Features include line and paragraph insert and delete, right and left justification, multiple copies, and line spacing. Extra functions include mailmerge, embedded footnotes, extra user defined character sets, plus a complete label program. List $69.90. Sale $56.00. (plus postage) Disk add $7.00.

QUICK BROWN FOX WORD PROCESSOR

(Cartridge). Nationally advertised all purpose word processor that uses menu control to let you manipulate your text. Includes the features most often asked for including right and left justification, wordwrap, and more. List $69.00. Sale $59.00. (plus postage).

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We guarantee a durability of 3.5 million passes per track. To give an example of how long our diskettes would last, if a customer updated his diskette (rewrote every track) once every hour, he would have to continue this process for over 200 years to equate to the 3.5 million pass level.

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DS - DD Storage Box	3.50
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Vydec Compatible	
511	3.55
WANG Compatible	
SS - SD - 32RH	2.55
CPT 6000-8000 Compatible	2.45
5¼" Diskette	
Single Sided - Double Density - Soft or Hard Sector	
SS - DD - RH Storage Box	1.99
SS - DD - RH Bulk with Envelope No 3M Logo	1.90
Double Sided - Double Density - Soft or Hard Sector	
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DS - DD - RH Bulk with Envelope No 3M Logo	2.75
SS - DD - 96 TPI - RH	2.85
SS - DD - 96 TPI - RH Bulk No 3M Logo	CALL
DS - DD - 96 TPI - RH	3.80
DS - DD - 96 TPI - RH Bulk No 3M Logo	CALL
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CIRCLE 144

(continued from page 253)
transmission is over twisted pair cable at one Mbaud.
$495
Corvus Systems
San Jose, CA 95131
retail
CIRCLE 563

Data Link Model 110 Line
is an interface adapter, designed to operate in point-to-point applications or in multipoint networks. As many as eight simultaneous full-duplex, 9600 bit per second data transmissions could occur over the common AC power line.
$250
Data Link
Issaquah, WA 98027
retail
CIRCLE 564

MICOM Micro4000
is a multiport modem that combines a time division multiplexer with a small 9600 bps modem that can support up to four synchronous terminals or channels on one unconditioned telephone line.
$3695
MICOM Systems, Inc
Chatsworth, CA 91311
retail
CIRCLE 565

MICOM Micro400 Local Dataset
is pocket-size and plugs directly into a terminal or computer RS-232 interface. Additional cables or power cords are not necessary for operation. It features full-duplex, asynchronous communications. Data can be sent over three miles when operating at9600 bps. Two models are available: Model 430 intended for customer-owned lines and Model 431 designed for operation over telephone-company-supplied limited distance private circuits.
$85—Model 430
$95—Model 431
MICOM Systems, Inc.
Chatsworth, CA 91311
retail
CIRCLE 566

MultiLink
is a low cost, local area network that permits sharing of hard disk resources among up to 255 IBM Personal Computer or XT users. It is based on ARCNET levels 1 and 2 and is compatible with higher level Xerox Network Systems protocols. It uses token passing control technique at a maximum distance between any two stations of 20,000 feet. Data is transferred at 2.5

When you visit your dealer and compare the Princeton IBM-compatible HX-12 side-by-side with the IBM color monitor, your eyes will see the difference.

The HX-12 gives you higher resolution and finer dot pitch (.31mm) than the IBM 5153's medium resolution (.43mm) for a cleaner, sharper image.

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Princeton Graphic Systems

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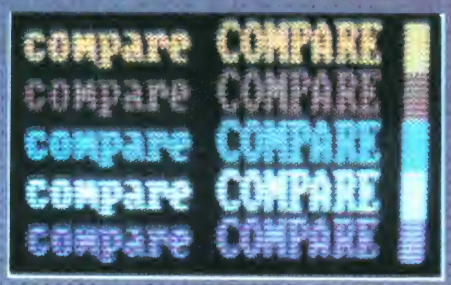
800-221-1490

CIRCLE 145

DON'T COMPROMISE:

OURS: .31 mm dot pitch, 80 column text.

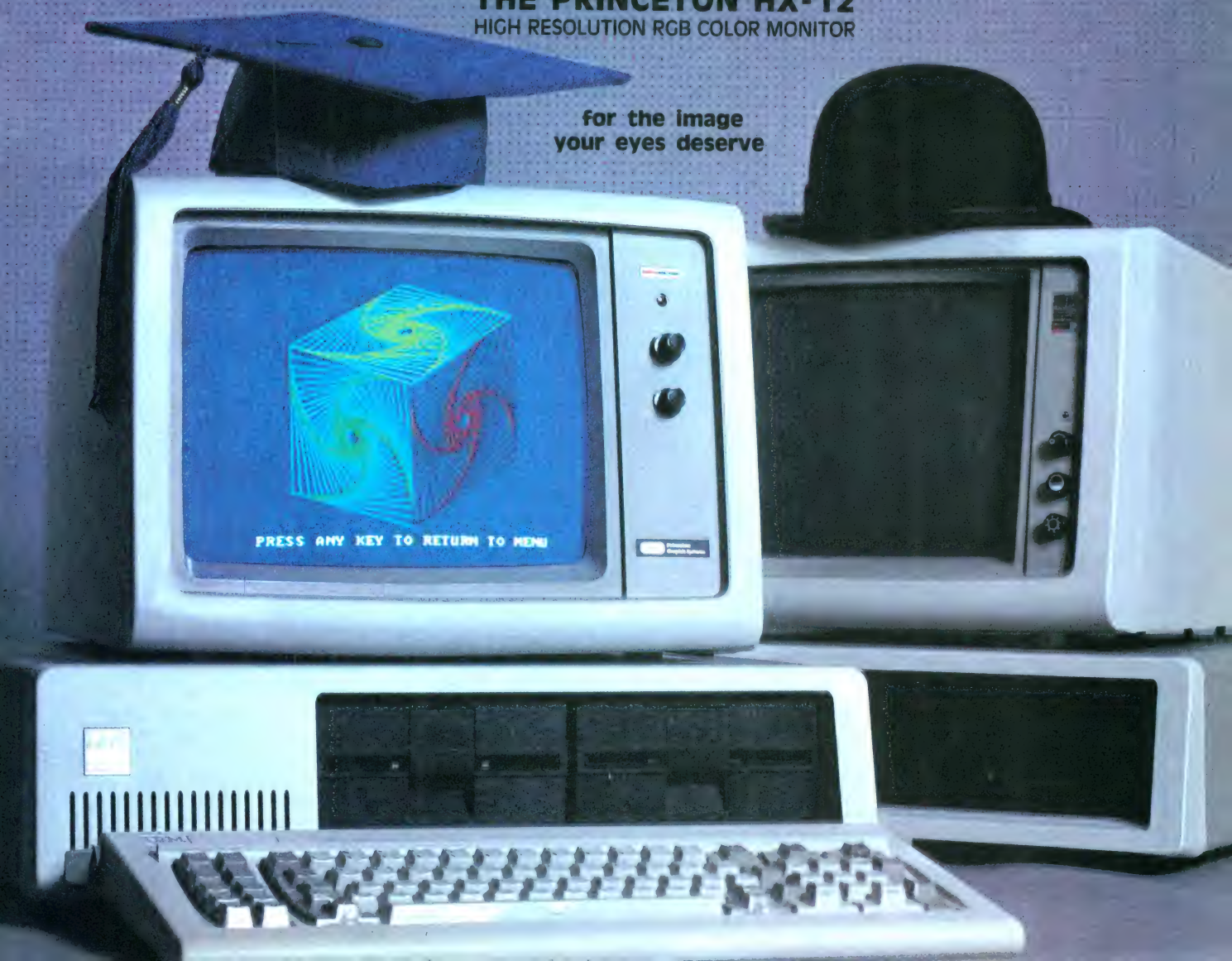


THEIRS: .43 mm dot pitch, 80 column text.

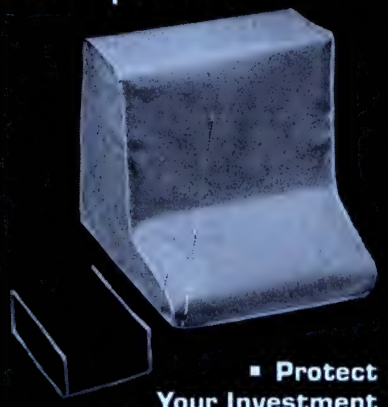
THE PRINCETON HX-12

HIGH RESOLUTION RGB COLOR MONITOR

for the image your eyes deserve



Kover your Apple® or other Personal Computer



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CIRCLE 238

GEMS OF WISDOM

Stop Trailing Characters

My problem concerns the "mmerge" (mail merge) macro in the Spellbinder word-processing program. While doing personalized form letters for a customer, I realized that trailing characters in one of the inserted fields had been dropped. I eventually found that the common thread was the length of the inserted string. As configured, the macro truncates at 43 characters, and revision is not part of the installation process. Since Spellbinder provides for writing your own macros, I felt it might be possible to change one of Spellbinder's.

The way to do this is to read mmerge.wpm as a normal file. Do not load it as a macro. Line 1 of the program—the statement after the single #—should be :on -1 115 SET UP OPTIONS. Following that are seven blank comment lines. Delete one of the comment lines and inset the statement :ss 70 ahead of line 1. Finally, change the last line of the program (126 in mine) to read :on -1 3.

We set our string lengths to 70 characters instead of the default 43. Then we inserted a new statement and moved the first statement down. The branch destination in the last statement had to be increased by one so the program would follow the original flow. This fix works with "mmerge" dated 1-15-82 as implemented on the Eagle II. The same approach should work for other systems.

Had I been aware of this problem before, I wouldn't have wasted time setting up "crib" files to accommodate the overlength inserts. Maybe this gem will save time for you, too.

Curtis A. Preston
SHALIMAR, FL

This Gem of Wisdom wins $25 for Curtis Preston. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, *50 Essex St., Rochelle Park, N.J. 07662.*

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$100—Passive 4-connector hub
$800—Active 8-connector hub
$500—Multi-OS software
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Sunnyvale, CA 94086
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CIRCLE 567

MultiSpool Model DP
is a 60k spooler that features a Data Products compatible interface to network four personal computers with a mainframe and line printer. With plug-in connection, it automatically transmits and schedules the printing without using CPU memory.
$1395
Digital Laboratories, Inc
Watertown, MA 02172
retail
CIRCLE 568

MuSYS NET/work 8816
uses multiprocessor architecture, extensive mass storage facilities, and TurboDOS. It comes with an 8-inch, double-sided, double-density floppy and either a 16, 24, or 51 Mbyte formatted Winchester. It expands from two to eight users via slave processor cards that give each user 128k of RAM, a 63.5k TPA, and a hardware isolated Z80 processor.
$11,995—eight-user with 16 Mbyte Winchester
MuSYS Corporation
Los Alamitos, CA 90720
retail
CIRCLE 569

PC/FOCUS DBMS and Information Control System
is IBM-compatible and functionally identical in both its mainframe (FOCUS) and personal computer versions. It includes an integrated full-screen editor and an asynchronous communications program for file transfers.
$2200
Information Builders, Inc.
New York, NY 10001
retail
CIRCLE 570

Remark Datacom Models 63-3S and 63-4S
are RS-232 to RS-422 converters that enable the coupling of RS-422 equipment with the installed base of RS-232 equipment. They also perform the function of a pair of high speed, short haul modems.
$126

Remark Datacom Inc.
Woodbury, NY 11797
retail
CIRCLE 571

StationMate
is a data communication system that combines a statistical multiplexer, an intelligent modem with automatic dialer, and local area network interface into a single device. It can support up to 64 devices over a 5000 foot bus.
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Complexx Systems, Inc.
Huntsville, AL 35802

BOARDS

CCA-100 Calendar/Clock/Alarm Board
provides a calendar, clock, alarm, timer, and 64-channel analog-digital-analog conversion capabilities. It can display hours/minutes/seconds, and day/month/year on a CRT, and time events in second increments.
$228

Industrial Computer Designs
Westlake Village, CA 91362
retail
CIRCLE 574

Colormate
makes an expansion chassis and disk operating system designed for the TRS Color Computer and the TDP-100. It is external and features the Software Dynamics SDOS 1.1 operating system, BASIC compiler, and assembler and editor. It allows access to 64k of RAM, a programmable baud rate, RS-232 serial port, and an 8-bit parallel port/Winchester disk interface.
$494
Computer Systems Distributors
Anaheim, CA 92802
retail
CIRCLE 573

Doryt System PARAPRINT 18A
is a parallel printer interface for the TI 99/4A and eliminates the need for the external peripheral expansion box and RS-232 interface card.
$105

Doryt Systems, Inc.
Glen Cove, NY 11542
retail
CIRCLE 575

Fastcard
is designed to speed up execution times on Apple computers by three times normal speed while providing all the functions of a language RAM card for the Apple. It contains 16k RAM.
$299.95
Synertek
Santa Clara, CA 95054
retail
CIRCLE 576

RAMMASTER 32
is a memory expansion board for the VIC-20 featuring a built-in expansion port, pause switch, write-protect switch and a disabler switch so cartridges can be removed without turning off the computer. It will expand the VIC-20 up to 37k RAM.
$150
Mosaic Electronics
Oregon City, OR 97045
mail order
CIRCLE 536

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80 COLUMNS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
CP/M	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
NUMERIC KEY PAD	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
UPPER AND LOWER CASE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC SPREAD SHEET	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
WORD PROCESSING	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
12" DYNAX GREEN SCREEN MONITOR		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
1 DATA DISK DRIVE			YES		YES		YES		YES			
2 DATA DISK DRIVES				YES		YES		YES		YES	YES	YES
CONTROLLER CARD			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
147K SOLID STATE MEMORY BOARD					YES							
294K SOLID STATE MEMORY BOARD						YES					YES	YES
APPLE COMPATIBLE—RUNS APPLE PROGRAMS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
DAISEY WHEEL PRINTER-SANYO PR5500							YES	YES				YES
DOT MATRIX PRINTER GX-100T 50CPS									YES	YES	YES	
PRINTER CABLE							YES	YES	YES	YES	YES	YES
PRINTER INTERFACE CARD							YES	YES	YES	YES	YES	YES

CIRCLE 147

commodore SUPER-MART

★★★★★★★★★★★★★★★

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Versa-RAM plus II
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FURNITURE

Compu-Table
organizes personal computer disk drives, monitor, printer, keyboard, and manuals into one area. It is made of steel tubular framing and a woodgrain top. Features include a built-in printer slot, and a cord and ribbon slot to allow it to fit flush to the wall. The height is 27 inches, and it has an optional "Datatop" shelf for storage above the unit. An optional light fits under the Datatop, providing a direct light source. Tops are interchangeable and can be purchased in conversion kits as space requirements expand.
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Gusdorf Model 4140
has an adjustable hutch unit available in two configurations: It can be used to form a shelf that spans the full width of the desk, or it can be stationed at either the left or right side to cover only half the width. Plated dividers organize software, manuals, and accessories. This table has enough room for keyboard, printer, modem, disk drive, and other equipment. An acrylic coating protects the unit from scratches and stains. The table can be combined with expanders or other desk units to create an extensive, functional workstation.
$195
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Information Station
is a workstation for the home computer. It is made of tubular steel with a non-glare "computer-white" top complemented with a baked enamel support frame available in blue, black, white, or brown. An optional set of drawers attach to the left or right side of the desktop.
$225
$65 for extra set of drawers
Presentation Systems, Inc.
San Francisco, CA 94102
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PPCenter
is a portable/personal computer center with tilt shelves for video monitor and printer, a single-switch system operation, and full box paper storage. The legs are tubular and the work surface is 27 inches high.
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Computer Accessory Products Company
Long Beach, CA 90803
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Shelve-It
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$89.95 plus **$4** shipping and handling
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The Computer Control Center
is a desk-type workstation which includes an on/off switch to eliminate constant plugging and unplugging of the system. It accommodates all brands and sizes of RAM packs. Software tapes are held in specially formed pockets; openings are provided for the Timex printer and cassette deck hookups. Cords and wires fit under the unit. The Computer Control Center is $3\frac{5}{8}$-inches high, 20-inches long, and $14\frac{1}{2}$-inches wide. It will accommodate a 13-inch TV screen.
for Timex-Sinclair 1000 and Sinclair ZX-81
$29.95
Timeworks, Inc.
Deerfield, IL 60015
retail
CIRCLE 587

MISCELLANEOUS

Computer Command Mouse
is available in two models: 50-2110 for the Apple II, and 50-2111 for the IBM Personal Computer. The mouse allows the user to move the cursor to any point on the CRT screen by sliding it across a desktop surface. It lets operators add, delete, or move words and shapes with the touch of a button. The mouse can function as a word-processing editor, a spreadsheet analyst, or an alternate input device. It can also serve as a graphic plotter for bar charts or graphs. It is a game controller for board games, such as checkers or chess, which are designed with the option of mouse control. Computer Command Mouse comes with a five-foot-long tail-like cord that connects to the computer. With controller interface cards, Computer Command Mouse will perform multiple functions written into soft-

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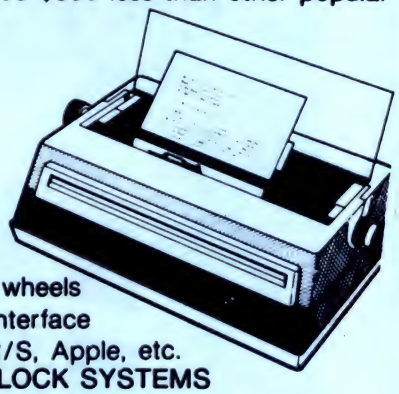

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Fast Point
is a light pen and controller supplied with a controller card, intended for slot 5 on the motherboard, and with a small extension board which plugs into IC sockets which normally house video multiplexer ICs. The pen can be used for cursor control and menu selection as well as low-resolution graphics. It is adaptable to existing software as well as new programs. The pen has a touch-sensitive switch which generates a signal when the tip is placed against an unblanked spot on the CRT. Sensitivity is 7 FL spot brightness, minimum.
for Apple II Plus
$240
HEI, Inc.
Victoria, MN 55386
mail order
CIRCLE 589

Mach II Joy Stick
is connector compatible with the Apple II and IIe, as well as the IBM Personal Computer. The gimble mounting is free floating in any one, or all four quadrants, and has 360-degree movement. The controller housing is constructed with plastic and secured with four-point construction.
$39.95 for Apple II
$44.95 for Apple IIe and IBM Personal Computer
Hayes Products
San Marcos, CA 92069
retail
CIRCLE 590

MicroDisk Mouse
resembles a tennis ball cut in half, and is designed to sit under a naturally cupped right hand. It has three buttons that sit under the thumb, second, and third fingers. The buttons come preprogrammed to indicate a carriage return, a Y, and an N, but these functions can be reprogrammed by the user. MicroDisk has revised its menu-driven operating system to use the features of the mouse. The MicroDisk Mouse is available only in conjunction with MicroDisk's 6, 12, 20, 27, 54, and 72 Mbyte integral hard disks.
for IBM Personal Computer and IBM-compatible systems
$500
MicroDisk, Inc.
Gardnerville, NV 89410
mail order
CIRCLE 591

Microsoft Mouse
is designed in two versions. One works with the IBM Personal Computer and includes a plug-in board; all interface hardware is included on the board which fits into any slot on the motherboard. The other is designed for any MS-DOS-based system; all the hardware for it fits inside the mouse itself and it interfaces to the computer using an RS-232-C interface. It is portable across any MS-DOS machine. No external power supply is required for either version. The mouse comes with three applications packages designed to train users in operating it. A musical tutorial teaches the user how to point with a mouse by moving the cursor around a piano keyboard displayed on the screen. Another program is the Game of Life, a population growth simulator which is designed to refine the skills of users and acquaint them with using a command line. The third application is Multi-Tool NotePad, a text editor that includes insert and delete features.
for IBM Personal Computer and MS-DOS-based systems
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Microsoft Corporation
Bellevue, WA 98004
retail
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Modem Interface
allows the user to connect a modem to his computer, and is compatible with the Micro-Connection, Smartmodem, CAT, and others. It allows use of your modem's auto-dial/auto-answer features. A three-foot cable with a standard DB25 connector is supplied, and a free auto-dial terminal program is included.
for Commodore 64 and VIC-20
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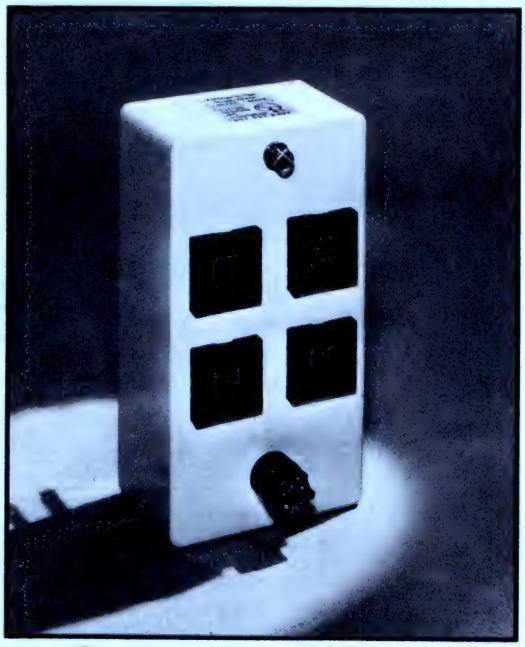
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CIRCLE 135

baud. The PC Modem Plus system includes a card-type modem, Crosstalk-XVI communications software, a phone cable, and instructions. The Modem and Speed Adapter comprise the communications system designed specifically for the IBM Personal Computer and XT.
for IBM Personal Computer and XT
$360 alone
$749 with the PC Modem Plus
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Santa Clara, CA 95051
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Power Director P1
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Spike Spiker DPS-Plus
is a voltage surge suppressor and noise filtering device which protects computers from voltage spikes and conducted line noise. It provides eight individually switched 120-volt, 15-amp outlets with an on/off switch, fuse, status lights, and seven-foot grounded cordset. Voltage spikes are suppressed in six different stages on both common and differential modes. Suppression starts at 131 volts and responds in one picosecond with an absorption capacity of 174.5 joules. Noise filtering is provided by inductive/capacitance series-parallel low-pass networks in five stages on both common and differential modes. Separate status lights monitor both modes.
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Kalglo Electronics Co., Inc.
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retail or mail order
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Track Pen
is used like a pen on a desktop to control the cursor; command is actuated by pressing the tip against the work surface area after tracking a function on the menu. It is similar in function to a mouse, and is designed to fit into the hand in a natural position.
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Ampower Instrument Company
Fairfield, NJ 07006
retail
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VOAD Keyboard Phone
is a voice-oriented auto-dialer that replaces standard rotary or touch-dialing telephones and allows high-speed automatic dialing from your computer. It connects to an RS-232 port, and is equipped with an RJ-11 jack for hookup to a handset, headset, or speaker phones. Added to your terminal, it permits detailed call recording, access to telecommunications budget systems, and with appropriate software, the selection of the most cost-effective call placement. It eliminates the need for standard dialing equipment, saving the user rental fees, desk space, and operator fatigue.
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VOAD Systems
Beverly Hills, CA 90211
mail order
CIRCLE 598

Voice Input Module
adds the capability of voice input to any existing Apple II and IIe application without programming. The unit includes the Apple II-compatible circuit board, the Voice Utility Program, a microphone with desk stand and footpedal switch, a manual, and all necessary cables and connectors. Unlimited vocabularies in subsets of up to 80 words or phrases are stored and recognized without use of Apple's memory or processing power, because the VIM has its own microcomputer and memory.
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CIRCLE 117

steps, illustrations, notes, a glossary, an index, and a summary of all commands.
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Wimette, IL 60091
retail
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Shurlock
is a software security device consisting of a coded hardware device which is intended to be used in conjunction with a small section of code imbedded in various areas of an author's software program.
$94
Software Security Inc.
Stamford, CT 06905
retail or mail order
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The Circuit Judge
is a line monitoring system for use with personal computers. It plugs into a standard 110-volt AC outlet and monitors your AC circuit for surges of 300 volts or greater, high voltage in excess of 125 volts, low voltage of 100 volts or less, and power loss. Any of these disturbances cause an LED display and a digital clock stops to indicate the time of day.
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Digitronics Marketing
Cumberland, RI 02864
retail
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The VisiCalc Training Videotape
teaches how to use VisiCalc easily. The instructor is Sanford Sorkin, a computer seminar course leader for the American Management Association. He has been teaching about computers since 1969 and has introduced personal computing to large and small businesses. This 90-minute videotape can be used with Apple, IBM, TRS-80, and compatible computers. Formats include VHS, Beta, and ¾-inch.
$195 for VHS and Beta
$235 for ¾-inch
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New York, NY 10014
retail
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VisiCalc Wallchart
is an 18-inch by 25-inch two-color wall chart that graphically depicts all commands. In addition to commands are actual keystroke combinations with specific explanations.
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Crest Software
Durango, CO 81301
mail order
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WattsOut
is an anti-static device which attaches to a ground. Users touch it before using the keyboard to release static electricity that can cause incorrect data entry, circuit damage, and memory loss. The device has the words "Touch Me" on it as a reminder to operators.
$9.95
WattsOut Inc
Denver, CO 80224
retail or mail order
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Wolsten Model 800
is a carrying case for the Atari 800 made of high-impact, molded ABS plastic with snap locks. It holds the computer, manuals, and a power supply and is designed to protect against shock, moisture, temperature, and humidity. It weighs three pounds, 10 ounces.
for Atari 800
$49.95
Wolsten's Computer Devices, Inc.
Whitehouse Station, NJ 08889
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Basic Accounting System (BAS)
is a general ledger and payroll system designed for both profit and non-profit organizations. It is menu-driven with screen prompts, and can be used for a single organization, or as a client write-up package. General ledger postings can be made through cash receipts, cash disbursements, or the general journals. Details from transactions are retained in these journals and can be printed at any time. Accounts can be reviewed at any time for current balance, year-to-date balance, budget or encumbrance information, initial set-up balance, and initial set-up date. BAS produces a variety of financial reports, including profit-and-loss

statements for the current period and year-to-date. The payroll feature provides totals after each pay period, which can then be posted to the general ledger. It computes payroll, calculates withholdings, prints payroll checks, produces information for periodic reports, and prints W-2 forms. It handles all standard withholdings and up to five miscellaneous deductions. The company maintains a technical support staff ready to make modifications or customize your program.
for Texas Instruments Professional Computer
$2000
The Management Accountability Group Inc.
Athens, GA 30603
retail or mail order
CIRCLE 300

Business Policy Planner
helps companies develop a corporate personnel manual. It includes legally-researched drafts on employment policies, recruiting, compensation, employee benefits, and employee expenses. Documents are written on floppy-disk files in standard ASCII format for use with most word-processing programs. Policies can be edited or expanded.
for 8-inch CP/M, Altos CP/M, Otrona, TeleVideo, IBM Personal Computer under MS-DOS, Victor 9000, and NorthStar Advantage
$199.95
Softlink Corporation
Santa Clara, CA 95051
retail
CIRCLE 301

California Corporation Start-Up Package
is an incorporation kit designed to save on the cost of forming a California "closed corporation." Documents can be completed and filed by users without the aid of an attorney. Forms come in standard ASCII format, allowing use with most word-processing programs.
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Chartman IV
is a business-graphics package and part of the Chartman series. Chartman IV provides organizational graphics, including scatter graphs and GANTT charts, intricate line charts, and a statistical curve-fitting feature. The Chartman series, consisting of Chartman I through Chartman IV, provides a range of monochrome and multicolored presentation business graphics in two or three dimensions. Users enter information into graphic pictures by filling in blanks; conversational instructions lead users through, and command functions correspond to function keys.
for IBM Personal Computer
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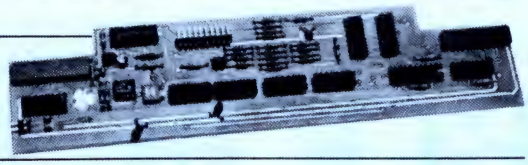

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Corvus Graph
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for Corvus Concept
$395
Corvus Systems
San Jose, CA 95131
retail
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Corvus Paint
is a black and white composing program which provides more than 200 commands and functions. Information to be portrayed can be put into the program using the Concept keyboard, a graphics tablet, or computer "mice." With the "Picture Undo" function, a user can backstep to erase mistakes. The commands are arranged in 20 levels of function keys, with the ability to move from one level to another, and consistent layout for often-used keys. Paint tools include a variety of dots, brushes, ribbons, lines,

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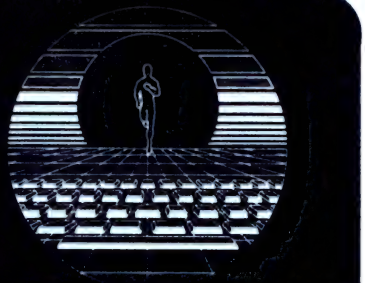

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includes a full accounts receivable system for private patient billing, an insurance claims management system for the preparation and collection of American Dental Association standard claims and preauthorizations, and a special appointment management system complete with patient reminder recall. The system prepares bills, claim forms, attending dentists' statements, account reviews, daily journals, monthly aged accounts receivable reports, and numerous practice productivity reports. The appointment system can prepare recall notices based on the schedule the dentist establishes for each individual patient.
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is a graphics and plotting program which allows users to generate two- or three-dimensional bar charts, point or line graphs, and pie charts on various color or black and white printers and plotters. It compares up to six sets of data on one graph. Up to 72 bars can be charted on a bar chart, and bars can be horizontal or vertical. Pie charts can have up to 12 slices, with one or more slices pulled out for interpretation. Slices are scaled and labeled, and percentages can be calculated for each slice. Fast Graphs includes a free drawing mode that lets users edit graphs and charts, and enter data from spreadsheet programs such as VisiCalc and MultiPlan. (Listed in May index with Innovative Software)
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$295
Softlink Corporation
Santa Clara, CA 95051
retail
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Financial Facts
calculates depreciation, interest, loan principal, future value, and other figures needed for personal and small-business management. It calculates payments, principals, and interest rates for loans. Amortization tables are available for mortgage payments or other long-term loans. It figures nominal and effective interest rates, and, for investments, computes future value, deposits, and annuities.
for IBM Personal Computer with PC-DOS and 64k RAM; and Apple II

(with Applesoft), II Plus, and IIe with 48k RAM
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Indianapolis, IN 46206
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for UCSD P-System operating systems
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Timberline Systems Inc.
Portland, OR 97232
retail or mail order
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GraphPlan
offers spreadsheet, statistical command, presentation-quality graphics, and sorting and ranking capabilities. The spreadsheet has built-in formulas to reduce the number of keystrokes required to perform an operation. GraphPlan will generate legends, as well as numeric, date, time, and logarithmic X- and Y-axis labels. It allows creation and combinations of explodable pie charts, horizontal or vertical line and bar graphs with stacking capability, and scattergrams. Because the package is fully integrated, changes in the spreadsheet are automatically recorded in the graphics. Users can switch between spreadsheet and graphics with a keystroke, without exiting the program.
for IBM Personal Computer under MS-DOS and CP/M; a minimum of 64k to 128k RAM is required
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is an interactive graphics package which produces presentation-quality graphics such as pie charts and bar charts.
for TeleVideo 8-bit and 16-bit systems
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Horizon Spreadsheet
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for UNIX operating systems
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Horizon Software Systems Inc.
San Francisco, CA 94107
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is written in a CP/M-86 Cobol format for use in multiuser operating systems and with 16-bit personal computers. The program presents numbered fields, with explanations for each field number at the bottom of the screen. There is error trapping

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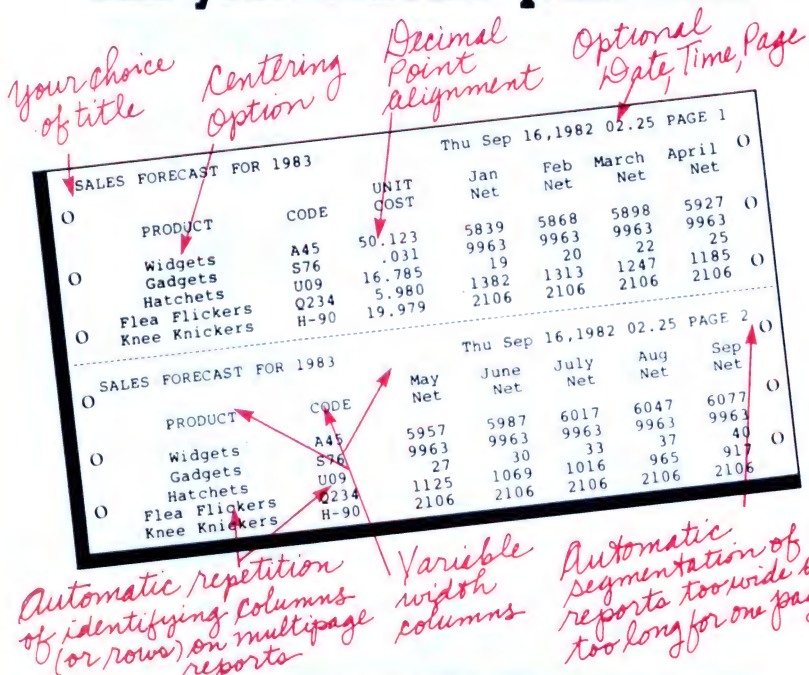
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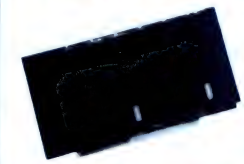

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P/N MG-064SP, add'l Ser, Par	695	499
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P/N MG-256SP add'l Ser, Par	1095	749
AST I/O Plus" Card		
P/N I/O-SP, Clk, (2) Ser, Par	265	199
AST Combo Plus" Card		
P/N MC256SPC 256K, clk, P/S 995		695
AST PC Disk++" Card		
P/N MD-064, 64K, Host, Par	655	495
CACTUS TECHNOLOGY		
300 Baud Direct Modum	349	299
COEX		
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CORVUS Hard Disk System		Call
DAVONG		
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	LIST	ACP
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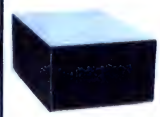

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Transend II	119	Tubeway	25
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COEX		
16K RAM Card	99.00	59.95
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Apple Extendercard	29.00	19.95
Apple IIe Ext RAM Card	199.00	149.00
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ORANGE MICRO		
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The Bufferboard	175.00	139.00
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CIRCLE 180

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The technique probably applies to many other line-printer cartridges. Just make sure that the typewriter cartridge ribbon width matches that of your line-printer cartridge. One final hint: Some typewriter cartridge ribbons include an extra twist within the endless loop. This should cause no problem if the extra twist is positioned past your print head. It also has the added benefit of extending the life of the new ribbon, since both sides are used as the ribbon advances through the cartridge mechanism.

Marshall Greenspan
FAIRFIELD, CT

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for IBM Personal Computer, CP/M, and CP/M-86
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Number Cruncher
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(continued on page 278)

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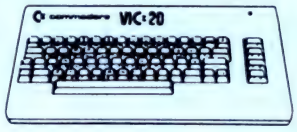

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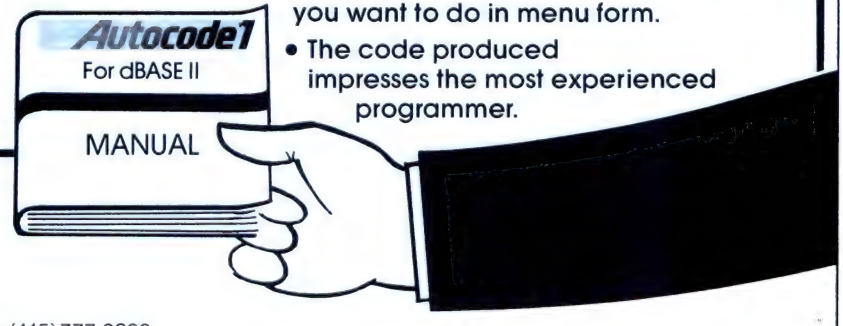

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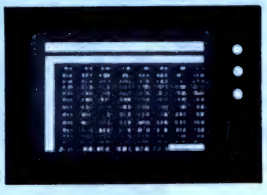

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Sup'r Ledger
is an accounting package which handles up to 200 separate accounts, 1400 transactions per time period, and 10 independent cost centers. It generates seven reports: working trial balance, balance sheet, income statement, general ledger, journals, chart of accounts, and budget income statement. Nineteen user-defined journal sources can be used for checking accounts, sales journals, and other purposes. An auto-recurring journal can be used for monthly amortization or depreciation, and an auto-reversing journal source is designed for accrual or the adjustment of entries. Sup'r Ledger permits

This One Decision Saved our Business and Grossed over $1,000,000. in Sales

In 1979, our recreational manufacturing business was booming. And we had developed a new product that looked like a real winner. The new product was extremely important, in that it appeared to be the answer to a seasonality problem associated with our other product lines.

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Faced with a fall and winter of virtually no sales, many thousands of dollars of unneeded parts and excess production staff, I had no choice but to shut down the production lines. And if a solution to our problem could not be found, the business itself was in jeopardy.

A life saving decision

I spent many sleepless nights trying to come up with a solution to this nightmarish situation. Then I remembered a course I had taken in decision analysis. I spent the rest of that night reviewing course material and other books I had bought on the subject. The next day,I called an emergency meeting.

Using the decision making techniques I had learned, we spent the rest of the week searching for and analysing potential solutions. The net result was that not only was the company pulled back from the brink of destruction, but we added over $1,000,000.00 in gross sales during that off-season.

A way of life

From that point on, almost every critical decision (and there were many) regarding new products, marketing channels, pricing, advertising, production equipment, engineering projects, received this same type of analysis.

Although the process was very time consuming and clumsy, because it had to be done by hand, our decisions were much improved. And there were some real benefits that we had not anticipated.

1. Our understanding of each problem was greatly increased.
2. We uncovered opportunities that we would not have thought of in any other way.
3. Our decisions were documented, preventing us from slipping off the selected path or 'rehashing' the same things over and over.
4. Consensus became easier because we were forced to focus and resolve each part of the problem, one piece at a time.

The birth of Decision~Analyst™

Decision~Analyst was created because the process of evaluating complex decisions with multiple alternatives and many criteria is very tedious and time-consuming if you do it on paper. And doing it in your head is virtually impossible.

Any complex decision usually requires multiple revisions to criteria, alternatives, weights and values assigned to them. If done manually, the ordeal of rewriting, recalculating and redocumenting tends to discourage revisions, thus producing poor results.

Decision~Analyst overcomes these problems by asking for the minimum input possible from you, in the correct sequence. It leads you step by step through the decision making process, then does all the necessary calculations and produces polished reports without any further effort. And all of your input is stored on your disk so that revisions and updates can be made easily at any time.

Comprehensive but easy to use

Decision~Analyst is probably the easiest program you'll ever use. You can literally learn to operate the program using only the 'help screens. But it comes with a thoroughly indexed manual which includes many pages of examples plus a step by step guide to the decision making process.

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If you're saying to yourself that you really don't have any earth shattering applications for Decision ~Analyst . . . then consider this. If you're in business, chances are that the most important thing you do is make decisions.

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Alphabet Zoo
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Arcade Search-Cassette
puts 374 letters on the screen, and players have ten minutes to find 20 different words—ten down and ten across. There are three categories: home video games, arcade video games, and video game characters.
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```
PROCEDURE PRINT_AVERAGE  (A, B, C : REAL);
  VAR
  SUM : REAL;
BEGIN
SUM : = A + B + C;
WRITE ('AVERAGE IS', SUM/3.0);
END;
```

To call up the procedure from anywhere in the program, just write;

PRINT_AVERAGE (3, 6, 15); or,

PRINT_AVERAGE (−1, 0, 37.4); etc.

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for Apple II, II Plus, IIe; IBM Personal Computer
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includes a COMMX smart terminal and file transfer program with automatic dialing and log-on to connected systems. Operation is possible from dial, local, and command menus. It has protocols for time-share, Modem7, and error-free CRC 16; it allows Telex/TWX operation via Western Union EasyLink. The package also has ConsolX for remote operation of an unattended computer, and an electronic mail transfer subsystem. There is a bulletin board system with custom data-base access. Utilities for data encryption, compression, keyboard macros, and directory displays are included.
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will support CompuServe's Vidtex, The Source, Dow Jones, TSO, VM, IBM Personal Computer communications, and other user-defined functions. It provides full Compuserve "B protocol" and handles their full graphics. It supports Radio Shack and Hayes auto-dial modems, and others which can respond to an ASCII character set. Compac can generate and use a disk file, store information to perform auto-dial and log-on, and define up to 10-character strings by entering an appropriate command with the ALT key depressed. Data received can be saved in a buffer, and then written to a disk file.
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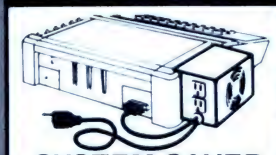

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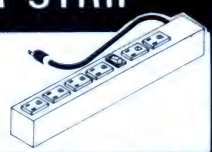

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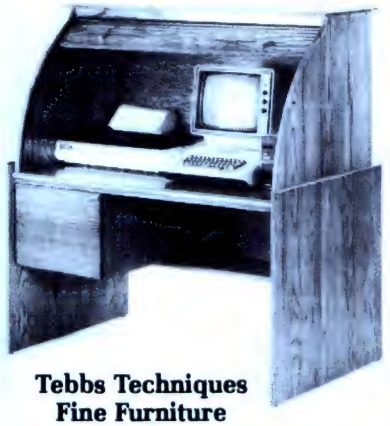

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CIRCLE 393

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is a communications and electronic mail program now available for the IBM Personal Computer. With a telephone modem and this program, users can access information bases such as Dialog and The Source, time-sharing mainframes, and other personal computers. The Micro Link II sends and receives any text, data, or program file up to the capacity of the user's disk drive. Several file-sending methods are available, including prompted line-by-line transmission and error-checked sector transfer. Other versions of this program run on the TeleVideo 800 and KayPro II as well as most systems equipped with CP/M 2.2, MS-DOS, or CP/M-86.
for IBM Personal Computer
$89
Digital Marketing Corporation
Walnut Creek, CA 94595
retail or mail order
CIRCLE 395

TRS to IBM PC File Transfer Program
allows the transfer of files from TRS-80 Models II, 4, 12, and 16 to the IBM Personal Computer or XT. Included is a communications program for the IBM Personal Computer as well as an adapter allowing the two systems to connect. The program also has several utilities to aid in the preparation of files for conversion and editing. It will transfer files in ASCII code, with embedded control codes, compressed binary formats, encrypted data bases, high level language programs, electronic spreadsheet data, word processor files, and other files. File linkage is provided as well as the ability to send files of any length; baud rates range from 110 to 9600.
for TRS-80 Models II, 4, 12, 16
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Santa Clara, CA 95050
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for IBM Personal Computer, Jonos, Osborne, KayPro
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Santa Barbara, CA 93101
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Cumsea
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$69.95
$26.50 for educational use
Custom Micro Systems Ltd.
Edmonton, Alberta, Canada T5X 3B2
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dBASIC
is an indexed relocatable library for CB/80 and CB/86 compilers which provides direct access to dBase II files. Many dBASIC functions are direct translations of dBase II commands. For example, "Select Primary" becomes "Call Select(1)" and "Use Myfile" is "Call Use ('Myfile')." Up to nine files may be open at once, and new functions allow direct retrieval of data-base

(continued on page 292)

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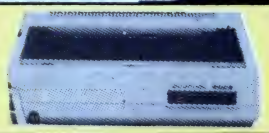

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CIRCLE 171

(continued from page 288)
characteristics such as field names and types.
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Active Software Marketing
Tempe, AZ 85281
mail order
CIRCLE 399

FILEBASE
processes files of records comprised of comma-deleted fields. Options include record selection, merging, sorting, creating new files, appending to existing files, selecting a subset of fields and modifying their contents, and rearranging fields or adding new ones. Records can be selected or excluded by testing field contents with a comparator, or against a list of up to 300 user values. Other select/exclude methods include a range or list of up to 1000 record numbers, and interactive examination of each record in real time. Other features output keys and record numbers to disk, convert lowercase to uppercase, and print records with comments added from the keyboard. FILEBASE can convert variable-length records to fixed length, and certain types of fixed-length records back to variable length.
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mail order
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Graphics Workshop
includes a collection of programs for those who are familiar with Atari BASIC. A player-missile device handler allows setup and use of player-missiles using Atari BASIC Open, Print, and Put commands. There are three graphics editors: a player-missile editor, a bit-map editor, and a character editor.
for Atari 400, 800 with 48k
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Renton, WA 98055
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MLS file converter
converts MLS files to Mail-X files, saving the time it would take to retype the 3000 records. It can convert more than one MLS file and merge into one Mail-X file. Mail-X can handle up to 32,767 records in a single file. It consists of 7 programs, has a sort/merge package that allows you to sort any field, and does not limit the number of records you can sort by memory. All the sorting is done separately.
for TRS-80 Models II, 12, 16; CP/M-80; MS-DOS
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$299 (Mail-X only)
Micro Architect Inc.
Arlington, MA 02174
retail
CIRCLE 402

Menu Master
allows the user to control job streams—to open and close files, pass parameters to programs, and process data with single keystrokes, saving many keyboard steps. Menu Master consists of one general-purpose set of menus which lets users perform any typical operating system function. It includes file and word processing menus, and a development menu allowing the user or dealer to create customized menus. It incorporates a programming language called the Menu Definition Language—a job control language allowing the moderately experienced user or programmer to develop specific menus. At all times, Menu Master indicates how much disk space remains. When the computer is shut off, Menu Master remembers all the variables entered into the file and brings it back with exactly the same parameters when the user begins again.
for CP/M
$195
Borland International
San Jose, CA 95129
retail
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Pascal Super Emulator
allows you to use up to four Legend RAM cards with the capability of combining the total RAM into one drive. Four 128k cards can yield up to 1024 blocks of storage in one disk drive.
for Apple Pascal 1.1 operating system
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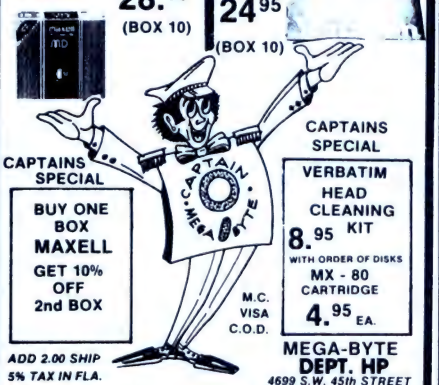

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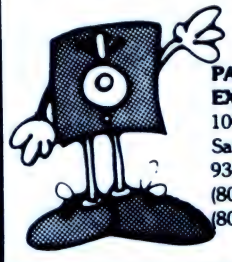

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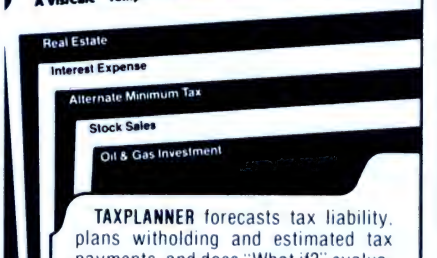

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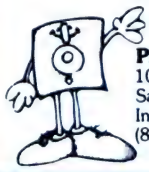

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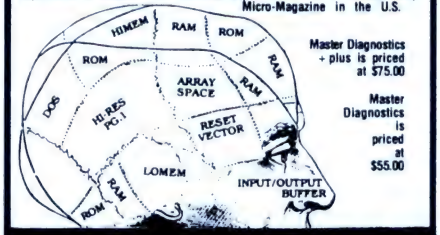

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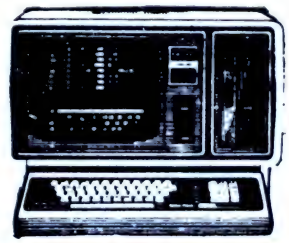

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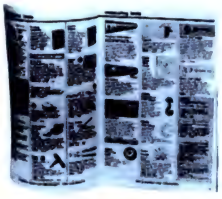

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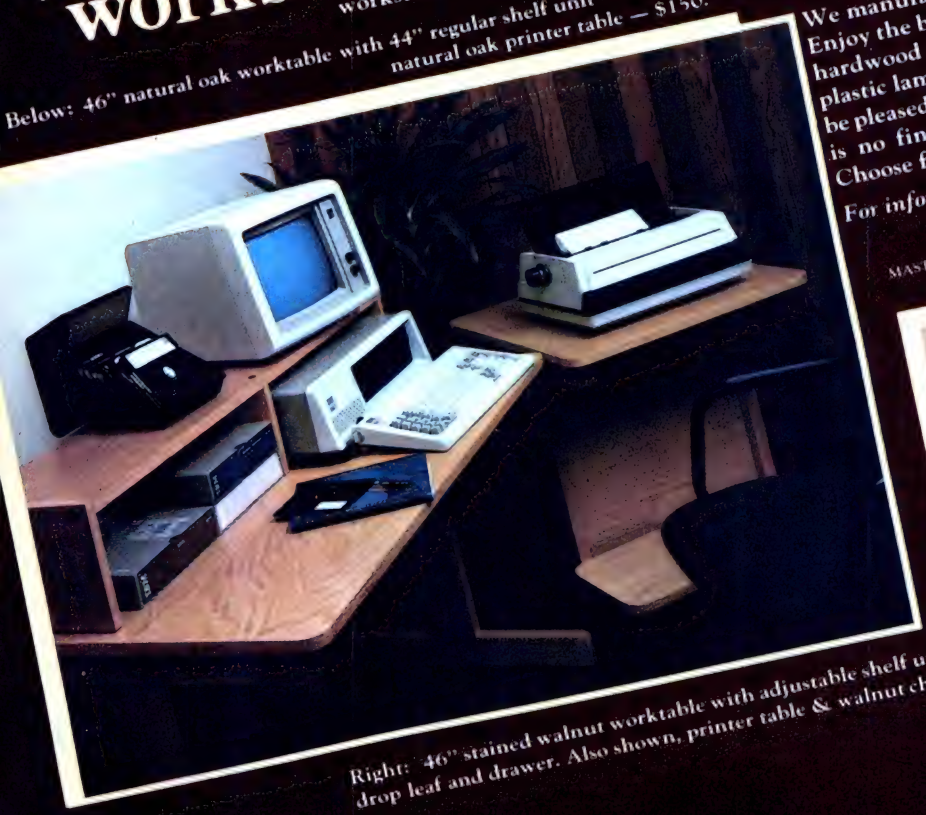

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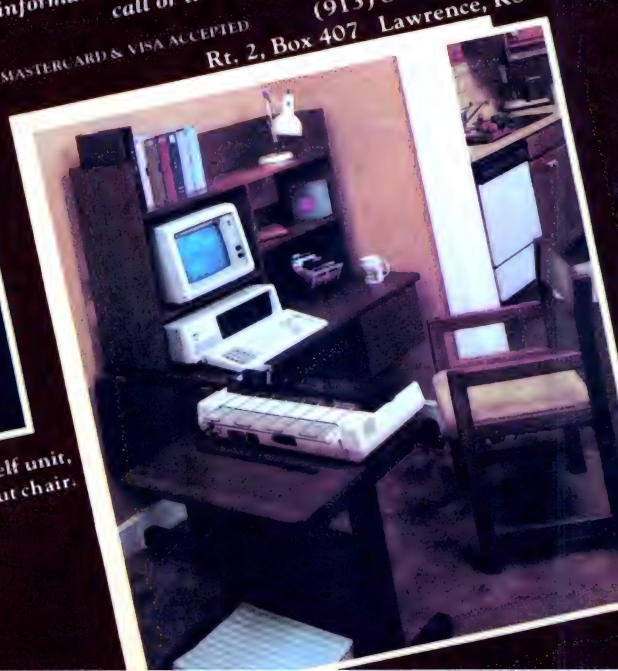

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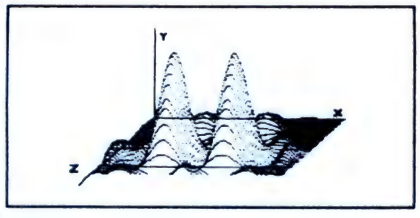

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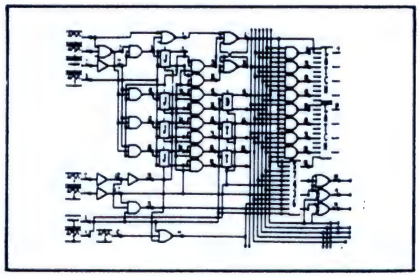

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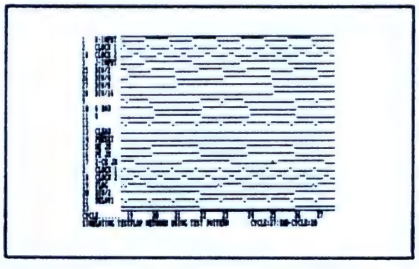

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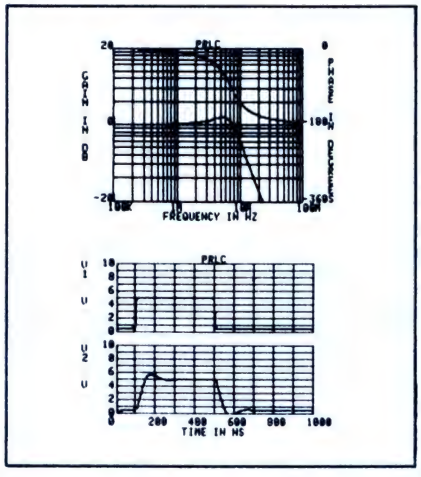

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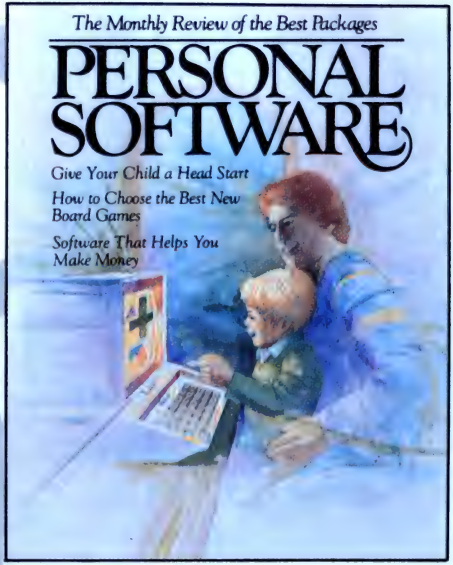
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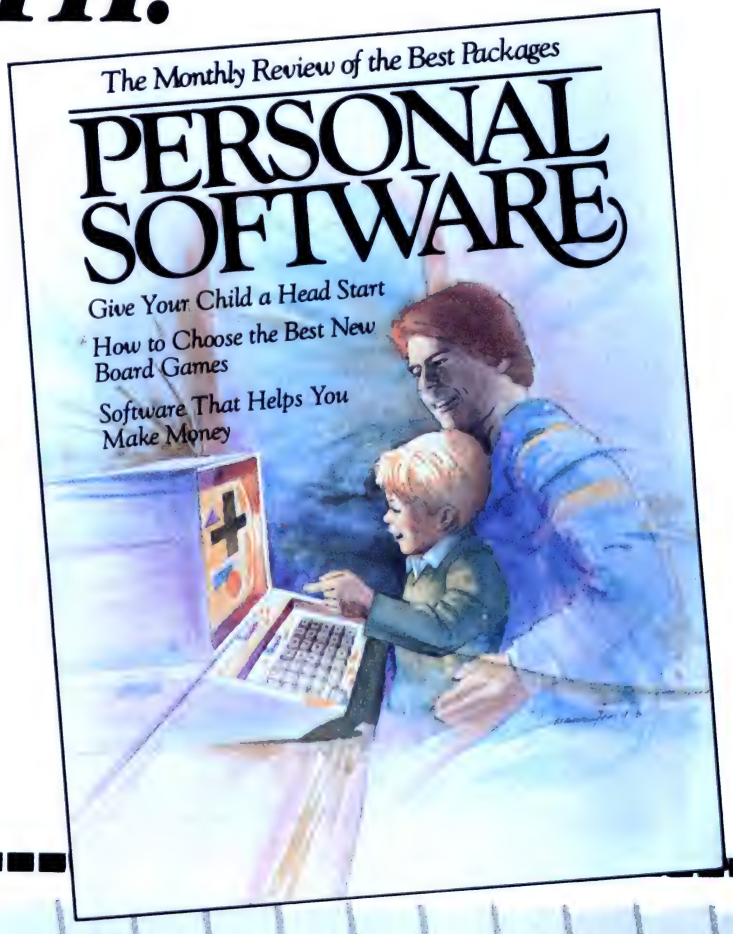
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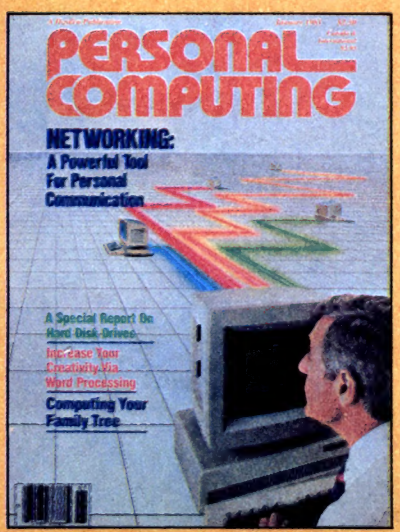
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INTERVIEWS

We talk to the people on the leading edge to find out what's on the horizon. The company presidents. The software writers. The whiz-kids who started it all. And the new generation who will take us even farther.

INFORMATION

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CIRCLE 101

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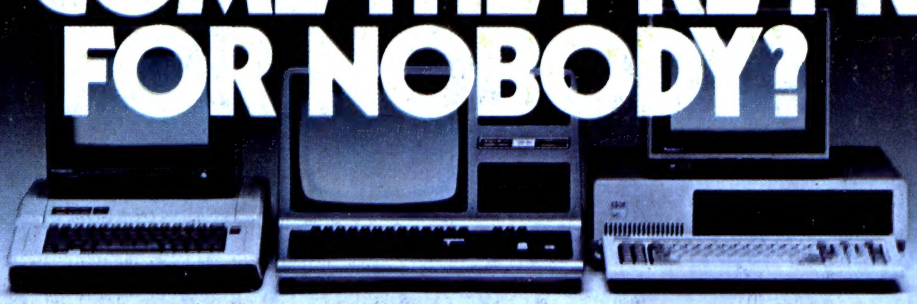

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But person persons.

In other words, all the persons whom Apple, IBM, and Radio Shack seem to have forgotten about (including, most likely, you).

But that's okay. Because now you can get a high-powered home computer without taking out a second mortgage on your home.

It's the Commodore 64. We're not talking about a low-priced computer that can barely retain a phone number. We're talking about a memory of 64K. Which means it can perform tasks most other home computers can't. Including some of those that cost a lot more. (Take another look at the three computers above.)

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And as great as all this sounds, what's even greater-sounding is the price. It's hundreds of dollars less than that of our nearest competitor.

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*Manufacturers' suggested list prices as of March 20, 1983. Monitor included with TRS-80 III only. Commodore Business Machines, P.O. Box 500R, Conshohocken, PA 19428; Canada–3370 Pharmacy Avenue, Agincourt, Ont., Can. M1W 2K4.

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